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CONTRIBUTORS TO VOLUME I.

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CRANDALL, FLOYD M., M.D.
FRAZIER, CHARLES H., M.D.
GRAYSON, CHARLES P., M.D.
PREBLE, ROBERT B., M.D.
RANDOLPH, ROBERT L., M.D.

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A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES, AND IMPROVEMENTS

IN THE

MEDICAL AND SURGICAL SCIENCES.

EDITED BY

HOBART AMORY HARE, M.D.,

PROFESSOR OF THERAPEUTICS AND MATERIA MEDICA IN THE JEFFERSON MEDICAL COLLEGE OF PHILADELPHIA; PHYSICIAN TO THE JEFFERSON MEDICAL COLLEGE HOSPITAL; ONE TIME CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE UNIVERSITY OF PENNSYLVANIA; MEMBER OF THE ASSOCIATION OF AMERICAN PHYSICIANS, ETC.

ASSISTED BY

H. R. M. LANDIS, M.D.,

VISITING PHYSICIAN TO TUBERCULOSIS DEPARTMENT OF PHILADELPHIA HOSPITAL, TO THE WHITE HAVEN SANATORIUM, AND MEMBER OF STAFF OF HENRY PHIPPS INSTITUTE; DEMONSTRATOR OF CLINICAL MEDICINE IN THE JEFFERSON MEDICAL COLLEGE.

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LIST OF CONTRIBUTORS.

WILLIAM T. BELFIELD, M.D.,
Associate Professor of Surgery in the Rush Medical College; Professor of Genito-urinary and Venereal Diseases in the Chicago Polyclinic, Chicago.

JOSEPH C. BLOODGOOD, M.D.,
Associate in Surgery, Johns Hopkins University, Baltimore, Md.

JOHN ROSE BRADFORD, M.D., F.R.C.P., F.R.S.,
Professor of Medicine and Physician to the University College Hospital, London

JOHN G. CLARK, M.D.,
Professor of Gynecology in the University of Pennsylvania, Philadelphia.

WILLIAM B. COLEY, M.D.,
Assistant Clinical Lecturer on Surgery, College of Physicians and Surgeons; Surgeon to the Hospital for the Ruptured and Crippled, New York.

FLOYD M. CRANDALL, M.D.,
Adjunct Professor of Pediatrics, New York Polyclinic Hospital; Visiting Physician to the Minturn Hospital for Scarlet Fever and Diphtheria; Consulting Physician to the Infants' and Children's Hospitals, New York.

WILLIAM EWART, M.D., F.R.C.P.,
Physician to and Joint Lecturer on Medicine at St. George's Hospital, and Physician to the Belgrave Hospital for Children, London.

CHARLES H. FRAZIER, M.D.,
Professor of Clinical Surgery in the University ot Pennsylvania; Surgeon to the University, Howard, and Philadelphia Hospitals.

WILLIAM S. GOTTHEIL, M.D.,
Professor of Dermatology and Syphilology, New York School of Clinical Medicine; Consulting Dermatologist to the Sheltering Guardian Orphan Asylum; Dermatologist to the Lebanon and Beth Israel Hospital, and to the German West Side Dispensary, New York.

CHARLES PREVOST GRAYSON, A.M., M.D.,
Lecturer on Laryngology and Rhinology in the Medical Department of the University of Pennsylvania; Physician-in-Charge of the Department for Diseases of the Throat and Nose in the Hospital of the University of Pennsylvania; Laryngologist and Otologist to the Philadelphia Hospital.

EDWARD JACKSON, M.D.,
Emeritus Professor of Ophthalmology in the Philadelphia Polyclinic.

H. R. M. LANDIS, M.D.,
Visiting Physician to Tuberculosis Department of Philadelphia Hospital, to the White Haven Sanatorium, and Member of Staff of Henry Phipps Institute; Demonstrator of Clinical Medicine in the Jefferson Medical College.

RICHARD C. NORRIS, M.D.,
Assistant Professor of Obstetrics in the Medical Department of the University of Pennsylvania, Philadelphia; Physician-in-Charge of Preston Retreat.

ROBERT B. PREBLE, A.B., M.D.,
Professor of Medicine in Northwestern University Medical School; Attending Physician to Cook County, St. Luke's, Wesley, German, and Polyclinic Hospitals, etc., Chicago.

ROBERT L. RANDOLPH, M.D.,
Associate Professor of Ophthalmology and Otology in Johns Hopkins University, and Associate Ophthalmic and Aural Surgeon to Johns Hopkins Hospital, Baltimore, Md.

WILLIAM G. SPILLER, M.D.,
Professor of Neuropathology and Associate Professor of Neurology in the University of Pennsylvania; Clinical Professor of Nervous Diseases in the Woman's Medical College of Pennsylvania and in the Philadelphia Polyclinic.

J. DUTTON STEELE, M.D.,
Associate in Medicine, University of Pennsylvania.

ALFRED STENGEL, M.D.,
Professor of Clinical Medicine in the University of Pennsylvania, Philadelphia.

CONTENTS OF VOLUME I.

PAGE

SURGERY OF THE HEAD, NECK AND THORAX 17

By CHARLES H. FRAZIER, M.D.

INFECTIOUS DISEASES, INCLUDING ACUTE RHEUMATISM, CROUPOUS PNEUMONIA, AND INFLUENZA 133

By ROBERT B. PREBLE, M.D.

THE DISEASES OF CHILDREN 209

By FLOYD M. CRANDALL, M.D.

LARYNGOLOGY AND RHINOLOGY 239

By CHARLES P. GRAYSON, M.D.

OTOLOGY 259

By ROBERT L. RANDOLPH, M.D.

INDEX 291

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PROGRESSIVE MEDICINE.

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SURGERY OF THE HEAD, NECK AND THORAX.

By CHARLES H. FRAZIER, M.D.

TRAUMATISM

Remote Consequences of Head Injuries. A series of Hunterian lectures were delivered by English[1] upon the subject of head injuries with especial reference to the remote consequences. The author studied the reports of some 300 cases, and classifies them under three heads: 1. Those with no effects. 2. Those with slight effects. 3. Those with marked effects. The observations were made at intervals of from one to twenty years after the accidents. The 200 cases which he was able to classify were divided into two groups of 100 each. In one slight or marked effects were noted in 69 per cent., and in the other in 52 per cent. Of the entire number only 12 patients died, and in but 1 of these could death have been said to be the direct result of the injury. The effect upon the individual's working capacity depended upon the form of occupation: 15 were able to do light work; 7 were partially and 6 totally incapacitated. Of 78 cases in which there was no evidence of fracture, 51 showed no signs of impairment, and of the remainder but 3 were totally disabled. A great deal of stress is laid upon the enforcement of mental rest after the injury has been received. It was noted that the best results were obtained in those cases in which mental rest was insisted upon for a reasonable period. In a general way it may be stated that in early life and in old age the powers of recuperation are not so good as in the intervening period. Among the after-effects are included the impairment of special intellectual faculties; thus, traumatic amnesia may be temporary or permanent, the musical and arithmetical faculties may be lost, as well as the sense of smell; somnambulism developed sometimes in children; in others there were persistent nystagmus and deafness;

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[1] Lancet, February 27, 1904.

in others, again, chronic headache, vertigo, depression, accommodation asthenopia, exaggeration of knee-jerks, slow or intermittent pulse. In speaking of the degree of mental impairment, he says: "While some degree of mental impairment is comparatively common after injuries to the head, the changes are seldom sufficiently marked to be included under the heading of insanity. Insanity may result from injury to any part of the head. Traumatism leads to insanity in two ways: 1. Direct insanity due to the actual injury to the brain or its membranes apart from hereditary or other predisposing causes. 2. Indirect insanity—that is to say, any form of insanity occurring as the result of lowered resistance of the brain due to injury in patients with a predisposition to insanity, hereditary or otherwise. Every variety of mental change may be produced by traumatism, although some forms are commoner than others. It is at present undetermined whether injury to the prefrontal region is more than likely to be followed by mental disturbances than injury to other parts of the brain. Only a small proportion of the cases of traumatic insanity are open to relief by operation, for a localizing indication in an accessible region must be present. The results so far have been encouraging, and, although the operation must necessarily be exploratory, it is fully justified in suitable cases, especially in face of the otherwise hopeless condition of these patients.

Hyperæsthesia in Head Injuries. After certain injuries of the head, as gunshot wounds, hyperæsthesia may develop in the distribution of the cervical nerves. The connection between the brain and the cervical nerves must be through the sympathetic at the base of the brain to the superior ganglions of the cervical sympathetic and thence to the upper cervical segments. Milner[1] reports three cases of gunshot wounds in which hyperæsthesia was well marked. In the first case a gunshot wound in the right temporal region, there was severe pain referred to the upper portion of the thorax. There were no symptoms of meningitis, nor of increased pressure; the region of the distribution of the trifacial was exceptionally free from sensitiveness. The seat of hyperalgesia was exclusively in the upper cervical zone. In the second case, on the day of the injury, there was marked hyperæsthesia in the upper portion of the thorax, to the middle of the sternum, on the neck up to the border of the jaw, and as far as the hair line of the head, but none in the face. The third case was a gunshot wound in the frontal region; there developed a hyperalgesia of the thorax, neck, and head (but not of the face), which had not disappeared at the end of a month and a half.

Fractures of the Skull. The Hunterian lectures on fractures of the skull, which were delivered by Rawling,[2] have attracted a great deal of

[1] Berliner klin. Woch., Nos. 17 and 19, 1904.

[2] Lancet, April 9, 1904.

attention and are worthy of careful study. The first lectures of the series are devoted chiefly to a discussion of the various theories which have been put forward to explain the production of fractures. Rawling is of the opinion that too little attention has been paid to the anatomical peculiarities of the skull, especially with reference to basic fractures. Stress is laid upon the fact that the base is in fact weaker than the vault, presenting numerous weak areas and weak lines which explain in many instances the direction that fractures of the base follow. In summing up his conclusions as to the various theories expounded, Rawling is of the opinion, first, that "the bursting and compressing theory and the contre-coup theory are both untenable; second, that Aran's irradiation theory, with certain modifications, accounts satisfactorily for those basic fractures which result from blows on the vertex; and, third, that most basic fractures result from forces applied directly around the basic level, and that these fractures are the result of a splitting force, the line of fracture tending to travel across the base, parallel to the original direction, but not necessarily in the same straight line."

Certain considerations should be given to other features which exercise great influence on the actual direction of the fracture, as, for example, the influence of sutures, of the air sinuses, of the auditory region, and of the basic foramina.

As to fracture of the vault, those of the external table are of such rare occurrence and of such difficult diagnosis that they form no exception to the rule that exploration should be carried out when there is any suspicion that a more extensive injury to the internal table may also be present. Fractures of the internal table are most common and most extensive in those regions where the diploic tissue is most abundant—*e. g.*, the mid-parietal and anterior frontal regions. Too much stress, therefore, cannot be laid on the fact that (1) fractures of the internal table only may exist without any visible or palpable injury to the external table, and (2) that when the external table is fractured there is in nearly every case a more extensive fracture of the internal table.

Certain peculiarities in the structure of the child's skull influence the direction and extent of fracture. In the first place the bones of the vault are elastic and pliable, and, secondly, a blow may lead to a bending in, temporary or permanent, without any actual fracture. Secondly, the diploic tissue is practically absent and consequently fractures of the internal or external tables only are almost unknown. Thirdly, the air sinuses are not existent or small. Bruising and superficial laceration of the brain are, however, more common in children than in adults, owing to the greater delicacy in structure of the arachnoid, pia mater, and cortex.

The mortality, varying according to the fossa implicated, increases from before backward. Naturally in fractures of the posterior fossa, containing as it does the vital centres around the fourth ventricle, the prognosis is correspondingly grave.

HEMORRHAGES. *External hemorrhages* may occur from the ear, nose, and orbital region. Of that from the ear too much stress is laid upon the fact that hemorrhage from the ear results from other causes than basic fractures, and the symptoms, when secondary to a blow on the head, should be regarded as practically diagnostic of fracture of the middle fossa. A very free hemorrhage from the ear strongly suggests an extradural hemorrhage from the middle meningeal artery, although in rare instances it may be indicative of an injury to one of the venous sinuses. Hemorrhage into the orbital region produces paralysis of the muscles, both from actual mechanical impediment to movement and from pressure on the nerves supplying the muscles, subconjunctival hemorrhages, palpebral and peripalpebral hemorrhages, and proptosis. Proptosis, severe, appearing almost at once, and progressive, suggests a severe fracture in the region of the sphenoidal fissure and cavernous sinus; when moderate, a fracture of the orbital walls; and appearing days or weeks after the injury, a fracture involving the region of the cavernous sinus, with injury to the internal carotid artery and the formulation of an arteriovenous aneurysm.

Internal Hemorrhages. The most important and suggestive features of fractures of the middle meningeal artery, according to the author's experience, are as follows: 1. The appearance of a temporal hæmatoma. 2. Copious and continued hemorrhage from the ear. 3. Twitchings of the facial muscles on the opposite side and twitchings or spasm of the muscles of the opposite arm and leg. 4. A brief lucid interval between the states of concussion and collapse. 5. Some alteration in the pupil of the affected side, more commonly a contracted pupil. Operation should be resorted to at the earliest moment; in doubtful cases it is better to operate and find no hemorrhage than to defer radical treatment until too late. If necessary the external carotid artery (not the common carotid) should be ligated.

CEREBROSPINAL FLUID. The escape of cerebrospinal fluid from the ear and nose is so much spoken of in the text-books that it is supposed to be of common occurrence, but such is not the case in Rawling's experience. The escape of a watery fluid in large quantities has been noted in the absence of fracture, and is derived from the membranous labyrinth or from the membranes of the ear or nose as a result of great vasomotor dilatation of the vessels. A diagnosis cannot always be based upon a chemical analysis; in the first place, although cerebrospinal fluid contains little or no albumin, the fluid is usually mixed with blood, which itself contains albumin; secondly, though there is a reducing substance in cerebrospinal fluid, it may only be found in the first portion which escapes, as later the fluid soon becomes a mere serous exudation. If the discharge begins within twenty-four hours of the accident, or if it is colorless and profuse, and if it continues for some days, the fluid is *almost certainly cerebrospinal in nature.* The time of onset, the duration, and the quantity are all subject to great variation. The discharge of cerebrospinal fluid does not materially influence the prognosis. It is inadvisable to syringe out the ear, as in so doing micro-organisms may be forced into the subarachnoid space. It is a better plan to swab out the meatus with some strong antiseptic and insufflate a little iodoform powder. When the fluid escapes into the nose, little can be done to prevent infection. Meningitis is a common result of fracture of the anterior fossa with this symptom.

CRANIAL NERVES. If it were not for the protection offered by their strong dural sheaths, the cranial nerves would not escape injury so frequently after fracture of the base. Injury to the olfactory nerves is the result almost invariably of a direct fracture involving the cribriform plate. As to the optic nerves, it is more than probable that an injury to them is secondary to a fracture, tearing off the anterior clinoid process, the fragment compressing or tearing the optic sheath and perhaps causing a hemorrhage within the sheath. The third, fourth, fifth, and sixth nerves are rarely subject to direct injury, but may be compressed by extravasated blood. Isolated paralysis of the sixth nerve—a not uncommon complication—results from the implication of the nerve as it laterally grooves the dorsum ephippii, which process is occasionally torn across in a fracture passing from one middle fossa to another. The seventh and eighth are, however, more commonly involved than any other basic nerves, owing to their intrapetrous course. The bas's in which these nerves are implicated may be classified as follows: 1. Early and partial paralysis of the facial nerve, accompanied by a variable degree of deafness. 2. Early and complete facial paralysis, with complete deafness. In the first group are included a great majority of middle fossa fractures, tending to involve the auditory region and evidenced among other symptoms by hemorrhage from the external auditory meatus. The arrest of function in the facial nerve is due often to hemorrhage and the deafness to various causes, according to the damage done to the membrane and vesicles. In many cases of this class recovery may be complete. In the second group of cases the fracture is usually the result of a blow in the occipital region, the fracture traversing the thin cerebellar fossa to the outer margin of the jugular foramen, extending thence across the petrous bone and terminating by comminuting the tegmen tympani. In this fracture the damage is irreparable; the facial nerve is cut clean across, and the auditory apparatus is severed in two. The ninth, tenth, and eleventh nerves passing through the jugular foramen are well protected and escape injury, and the twelfth nerve is practically never involved.

Variations from the normal in body *temperature* are quite constant; practically all severe cases of head injury show some definite thermometric changes, not so far as we know from any special lesion of bone or cortex, but resulting probably from the disturbance of the heat-regulating centre exerted by the injury. The temperature progressively rises as the cardiac and respiratory centres fail. The thermometric changes are so constant that they may be regarded as an almost infallible guide to the prognosis. If the temperature, at first subnormal, undergoes a steady and progressive rise, the prognosis is most unfavorable. If the temperature, at first subnormal, rises to 101° and remains steady for a short while, the crisis has been reached. If the temperature rises further the prognosis is gloomy; if it falls, there is hope of recovery. The temperature, at first subnormal, may remain so, or does not rise above normal. If the former, the prognosis is very bad; if the latter, very good.

From a routine examination of the fundus oculi in all his cases, Rawling found two distinct varieties of changes: (1) a disk with normal outline, the fundus showing marked engorgement of the retinal veins, however; and (2) a fundus presenting all the signs of true optic neuritis. The latter is seen only in those cases which succumb to a septic meningeal infection.

After discussing the various theories whereby the brain is lacerated, with inclinations toward the contre-coup theory, Rawling discusses the *pathogenesis of concussion.* He does not believe that concussion implies necessarily the existence of a brain laceration; concussion shows a close analogy to the condition of shock with certain superadded cerebral symptoms. The conspicuous lesions are venous engorgement and arterial anæmia in the first stage, and active hyperæmia in the second or reactive stage. Though the cerebral vessels are not presided over by the vasomotors, the venous engorgement of the cerebral vessels is probably secondary to the general venous engorgement of the right side of the heart and of the venous system, especially the splanchnic area, such as one sees in shock; in most cases the typical compression symptoms are absent; the symptoms peculiar to compression are probably due to increased pressure on the vital centres in the medulla.

As for *treatment* in the early stages, when shock is the conspicuous feature, the usual remedies should be adopted, but as reaction sets in the head should be elevated, ice applied to the head, and venesection practised from the external jugular. The latter is of especial value in reducing the intracranial exudation and pressure. Inasmuch as in all fissured fractures the injury to the internal table is apt to be greater than injury to the external table, early trephining and exploration are advocated in all doubtful cases. In cases of comminuted fracture the reposition of the comminuted fragments is open to objection, first, in that they are a source of irritation and increase the tendency to the formations of adhesions; secondly, because the fragments rarely undergo union; and, thirdly, because, owing to the fact that suppuration frequently occurs in this class of fractures, the fragments will undergo necrosis. The introduction of metal plates and gold-foil will prevent the formation of adhesions between the scalp and dura and between the dura and brain.

In those cases of basic fracture with or without compression, but pointing to a fatal termination, Rawling suggests a novel method of treatment which is based upon sound reasoning. Death in these cases is due to increased intracranial tension acting most forcibly on the nuclei in the region of the fourth ventricle; the amount of fluid in the cerebellar fossa is almost always much increased even when there is no obvious compressing agent, such as hemorrhage, foreign body, etc. An attempt should be made to relieve pressure by practising craniectomy in the cerebral fossa on the opposite side if the injury is inflicted in the anterior part of the head, and on the affected side if the blow was delivered in the occipital region.

Some of Rawling's views were diametrically opposed to those usually accepted; and with a view of contributing a number of consecutive observations toward the settlement of this question, as well as of studying other points of interest, Walton[1] went over the autopsy reports of fifty cases of *basal fracture.* In his opinion the following would be a reasonable working hypothesis as to the cause also of basal fractures: "When the trauma results from (1) pure compression, the bursting principle alone, or at least predominantly, underlies the fracture; (2) from a sharp blow, the violence is greatest at the point of impact and the transmission principle predominates; (3) from a fall, both factors take part. Between these three forms of trauma—*i. e.*, compression, blow, and fall—many gradations may occur, complicated still further by the character of the object causing impact and the age of the individual." In his series of fifty cases Walton found that "in a majority of the cases the basal fracture resulted from impact received in the horizontal plane upon the skull, whether upon the frontal or occipital region or upon the side of the head. While certain basal fractures extended from the vertex, there was no suggestion of the contre-coup of earlier writers. The line of fracture tended to enter the fossa nearest the point of impact, and to extend in the general direction in which force was applied. The lines of fracture in traversing the base tended to follow lines of least resistance, and in twenty-two of the fifty cases these lines corresponded more or less accurately to those indicated by Rawling, but the exceptions were too marked and too constant to allow the establishment of fixed rules. The sella turcica was implicated in 36 per cent. of the fractures. The petro-occipital and masto-occipital sutures furnished common lines of least resistance. Fractures extending across the base tended to run parallel to the petrous portion of the temporal bone and through the sella turcica. Certain blows on the occiput tended to cause a line of fracture extending to the jugular foramen or across the petrous bone. The portion of the petrous bone containing the auditory apparatus showed itself peculiarly liable to fracture, more often transversely than longitudinally. In seven cases (14 per cent.) the fracture was limited to the base after vault impact in the horizontal plane. Neither Rawling's theory of transmitted force nor the theory of bursting fracture of von Wahl and others suffices alone to explain these cases. The results of experiments with bodies of simpler structure would suggest that the bursting principle predominates in pure compression of the skull, and the principle of transmitted force in case of blows, while both play important parts in case of falls. The orbital foramen was implicated in 21.4 per cent. of the cases of orbital fossa fracture. Inequality and immobility of pupils, or both, furnish the most frequent and unfavorable sign of fracture of the base. In the forty-four cases in which the pupils were recorded, they were normal only in thirteen. Injury to the ciliospinal tract in its intracranial course is a more probable cause of the Hutchinson pupil and the other pupillary changes than injury to the third nerve or to the cortex, though no single lesion explains all cases. The reflexes may be lessened or lost in fracture of the base, as in any case of violent jarring of the brain. On the other hand, they may be increased even to spasticity, probably through direct pressure on the pyramidal tract, as by hemorrhage. It is probable that the initial result of the impact in all cases is a tendency toward lessening or loss of the reflexes. Profuse and persistent bleeding from the ear does not suggest middle meningeal hemorrhage. No middle meningeal hemorrhage was found in the cases of profuse and persistent bleeding, and, conversely, hemorrhage from this artery occurred eight times without and once with only slight bleeding from the ear."

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[1] Annals of Surgery, November, 1904.

CHOKED DISK IN CRANIAL CONTUSIONS. Bachauer[1] describes two cases in which simple concussion of the brain was accompanied by choked disk and headache; in one the choked disk began to appear five days after the injury, and was still present six years later; in the second case haziness of the optic nerve was still visible five years after the injury. In many cases of head injuries, though extravagant claims for damages have been made on the ground of vertigo, persistent headache, it is almost impossible to determine whether or not the patient is malingering. In the above instances, however, there were well-developed and easily recognized lesions.

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[1] Deutsche med. Wochenschrift, February 25, 1904.

MORPHINE AS A PROPHYLACTIC IN CEREBRAL INJURIES. The beneficial effects of opium in the treatment of patients suffering from serious cerebral injuries has long been recognized. Many of the older textbooks recommended the administration of opium in the form of Dover's powder as a routine treatment.

MacDougall[1] reminds us of the excellent results to be anticipated from the free use of morphine. If opium by its action upon the nervous system quiets the brain cells and lessens the functional activity of the nervous fibrils which connect them with one another; if it lessens pain and removes the effect of peripheral stimuli; if it contracts cerebral arterioles and through the cardiac ganglia renders the heart's action slower and vascular pressure less pronounced, then its effect upon a brain that is traumatically damaged and that demands quiet for its repair can only be beneficent.

Cerebral Hemorrhage. A rather interesting case from a medicolegal standpoint was reported by Atwood.[2] The patient, in alighting from a trolley car, fell to the ground, striking his head. In a short time the patient became unconscious, and died about nine hours after the accident. There were no signs of external injury, but at the autopsy one clot was found beneath the skull near the occipital protuberance and another, about the size of a golf ball, in the frontal lobe near the longitudinal sinus. The hemorrhage was explained on the contre-coup theory, the patient falling forcibly on the back of the head with sufficient violence to cause by contre-coup a rupture of a bloodvessel in the parietal region. The court asked this question: "If there were no external marks of violence and no fracture of the skull, how was it possible to state that the cause of death was due to violence or the fall?" The answer was: "The man never having had any cerebral symptoms of disease before, and in this case the symptoms having come on immediately or soon after an injury, with the finding of an ante-mortem blood clot beneath the scalp, in the region where he was struck when he fell with force, was evidence enough to consider the hemorrhage of the brain which caused death to be due to an injury and not to previous disease, together with the fact that there was no other pathological lesion present." *The court so ruled.*

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[1] Lancet, June 25, 1904.

[2] Boston Medical and Surgical Journal, March 24, 1904.

In the case reported by Krauss[1] there occurred a hemorrhage by contre-coup between the dura and the pia over the cap of Broca in the third convolution of the left parietal convolution. The patient sustained the injury by striking his head as he fell to the ground. The symptoms developed slowly and culminated in a focal epilepsy of the Jacksonian type on the fourth day. The vessel injured was undoubtedly a small vein of the pia and not one of the meningeal branches. After the clot was removed the patient made an uneventful recovery.

Several interesting features were noted in a case of intracranial hæmatoma reported by Gordon and Harris.[2] The extreme slowness with which the symptoms developed was the most striking feature. Not until two weeks after the accident (the patient having been struck in the head with a large stone) did the first sign of any serious intracranial lesion manifest itself, and that was a pain in the right leg. From that time on to the time of his admission to the hospital, about two months after the injury, a group of motor phenomena developed which pointed to a lesion near the precentral fissure. At that time the patient was more or less imbecile, nervous, and suspicious. At the operation a cavity the size of a hen's egg was found and evacuated in the substance of the brain more or less centrally over the Rolandic fissure. That the patient did not improve rapidly after the removal of the clot was due, it was suggested, to the fact that the brain did not expand immediately the clot was withdrawn. Once improvement began the restoration of tone to the muscles of the arm and leg took place rapidly, though not until the lapse of two months had the mental symptoms disappeared entirely. The slowness with which the evidences of pressure developed was very suggestive of a subarachnoid in contradistinction to an epidural hemorrhage. Bleeding from the middle meningeal or a branch would be much freer than from one of the intracranial vessels.

Psychical Disturbances in Lesions of the Frontal Lobe. It is a well-established clinical fact that lesions of the frontal lobe of the brain are in some instances attended with psychical disturbances. The observations which have been made at various times do not allow us even to attempt to localize with any degree of accuracy the centres in the frontal lobe for any of the various psychical functions. The results following disturbances from one cause or another of the frontal lobe have, indeed, been variable; in some instances a loss of considerable amount of cerebral tissue will be unattended with any disturbance whatsoever, and, again, there are other cases in which lesions of no considerable extent are attended with very definite disturbances. Then, again it is difficult to understand why after injury, as, for example, one in which there may be a general concussion or contusion, with increase of the intracranial tension and cerebral pressure, the symptoms will be those which can be attributed only to a lesion of the frontal region. Borchard,[1] in considering the etiology of psychical phenomena, is inclined to believe that they are due not to the lesion itself primarily, but to the recovery phenomena surrounding or resulting from the lesion. Thus, in cases of advancing tumor or in cases of abscess there will be in advance of the tumor and around the abscess a zone in which the tissue will show evidence of irritation, and so after injuries there will result a more or less permanent disturbance of the circulation of the meninges or of the brain itself. In this connection he reports a case of abscess of the frontal lobe which exhibited three points of especial interest. First, the time intervening between the injury and the development of the abscess. Second, the presence of abnormal psychical conditions during the existence of the abscess. Third, the return to a normal psychical state after the abscess had been opened. The abscess did not make itself manifest until eight months after the injury was inflicted, at which time signs of acute psychical disturbances made their appearance. That these symptoms were due to the development of the abscess and the resulting recovery phenomena in the tissues and not to the result of the injury is very evident from the fact that the symptoms did not appear immediately after the injury, but only when the abscess developed, and disappeared again after the abscess was opened.

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[1] American Journal of the Medical Sciences, September,1904.

[2] Lancet, April 30, 1904.

Injuries of the Hypophysis. This question was discussed at the Thirty-third Congress of the Deutsche Gesellschaft für Chirurgie. Madelun recorded a case of a girl, aged nine years, who had received a gunshot wound of the head, and the course of the bullet was such as to suggest an injury to the hypophysis or its surroundings. The child had a unilateral amaurosis the remains of a hemiplegia, and an enormous adiposity. Stolper spoke of a case in which after a fall upon the back of the head an acromegaly had developed. The patient died, and the autopsy revealed the hypophysis unusually large and œdematous, and a metastasis in the right occipital lobe. Injury to the pituitary body may be caused by fracture of the base by the penetration of foreign bodies, by gunshot or stab wounds. V. Eiselsberg conducted a series of experiments to determine the effect of extirpation of the hypophysis, but the animals died soon after the operation.

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[1] Archiv f. klin. Chir., Band lxxiv., Heft. 1.

INFECTION.

Cerebral Infection. In his address in "Surgery," delivered before the British Medical Association, Sir William Macewen[1] expressed his views as to the localization of cerebral abscesses and the avenues by which the infection travelled to the brain. Abscess of the brain was once regarded solely as of a pyæmic nature, occurring by metastasis, and, owing to the aberrant manner in which abscess happened to occur, in parts which gave rise to functional manifestation. In the light of his later experience he believes this view to be erroneous. All brain abscesses arising from foci within the cranium are, if not in direct contact with such foci, at least in contact with the infected path between the two. Knowing the primary pyogenic focus, one can count upon the abscess being situated within a circumscribed radius of that point. In the great majority of cases in which brain abscess has formed from primary foci in the exterior of the skull, the abscess is situated in direct contiguity with the infected structures. Anatomical features generally determine the particular direction in which the pyogenic organisms proceed from the primary focus of the brain. Thus, for example, in the case of an intracranial abscess resulting from middle-ear disease one knows that the abscess is well from within a limited area of the ear, and, furthermore, that its location will be influenced by the path of extension. When the latter is by way of the internal meatus a basal meningitis results; when the tegmen or the sigmoid sinus is invaded, a local meningitis or abscess of the cerebrum or cerebellum follows. Abscess of the brain seldom or never occurs by pyogenic organisms travelling by way of the internal auditory meatus. The anatomical features of the part make this unlikely. The brain is kept apart from the original focus by the whole length of the internal auditory canal. The exposures of the brain membranes, which ensheath the nerves in the canal, dip right into it. A leptomeningitis is thus set up, and spreads to the basal membranes. Macewen has seen ten cases of tuberculous meningitis in which the middle ear was involved without perforation of the tympanii membrane. In five of these intracranial operations were performed, with the hope that the process was still localized, and this proved to be the case in three. These cases not only recovered from the operation, but regained strength and vigor. In suspected cases of tuberculous meningitis one should always look for the original tuberculous focus. It may easily be overlooked and even in post-mortem examination a casual examination of the interior of the skull might overlook the channels of extension, and, therefore, the primary focus might remain undiscovered. Tuberculosis of the middle ear may give rise to disseminated lesions through the sigmoid sinus; the tuberculous granulation tissue may invade the sinus and thus gain entrance to the general circulation.

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[1] British Medical Journal, July 30, 1904.

CRANIAL TUMORS.

Lumbar Puncture. This is a dangerous procedure when applied in cases of brain tumors, and especially those cases in which the communication between the cerebral ventricle on the one hand and the subarachnoid space and central canal of the spinal cord on the other is interrupted. Under these conditions the equilibrium between the spinal and cerebral fluid is disturbed, and there is danger of directly injuring the medulla oblongata. In one case a wedge-shaped piece of cerebellum was forced into the foramen magnum. Not only is the procedure dangerous under these circumstances, but it will be useless, since, when the communication with the cerebral ventricle is cut off, one cannot reduce the intracerebral pressure. Before 1900 Gumprecht collected fifteen cases of sudden death after lumbar puncture for cerebral tumors. Another fatal case is reported from the Dorpat Clinic by Masing.[1] About 30 c.c. of cerebrospinal fluid were withdrawn, reducing the pressure to zero. Before the operation was completed the patient suffered from nausea and intense headache; she died fifteen hours later. At the autopsy it was found that death was due to cerebral hemorrhage, which it was supposed was brought on suddenly by lowering the blood pressure.

Gayet[2] reports another case of lumbar puncture for a cranial tumor, in this instance, of the occipital lobe. The operation was performed for the relief of headache, and, although the patient's general condition was excellent at the time, she died one week later. The headache was relieved only temporarily and to a very slight degree, but soon became more intense than ever.

Surgical Aspects of Brain Tumors. In a paper[3] upon the surgery of tumors of the brain I pointed out a number of observations and conclusions drawn from my operative records. The greater attainments in more recent years are, I believe, to be attributed to an earlier recognition of the tumors; to a correspondingly earlier resort to operation; to more accurate localization, and, finally, to certain distinct improvements in technique, to wit: a speedier method of opening the skull, the exposure of a much larger area than was possible before the introduction of the osteoplastic flap, and the adoption of the two-stage operation in these cases in which the blood pressure is materially reduced by the preliminary procedures. Many of the improvements or modifications of technique in operations upon the brain have in view a common object, the prevention of shock. "All measures recognized as prophylactic of shock should be observed stringently. In these we have the most effectual means of reducing the mortality. The most important of them are: (*a*) the avoidance of prolonged operation, (*b*) the prevention of excessive hemorrhage, and (*c*) the avoidance of unnecessarily rough manipulation of the brain substance." Since the element of time plays such an important part in the results of brain operations, that method should be used which will expose the growth in the shortest time. With the electric engine and drill, which I use in all my craniotomies, a given area of brain can be exposed with the least degree of traumatism and the greatest economy of time. A considerable amount of blood will be lost in these operations, even before the tumor is exposed, unless some measures be adopted to prevent it. Crile's method of temporarily closing the carotid should be reserved for extreme cases, and practised on one side only; it is not unattended by danger, and is ineffectual in that it controls only arterial but not venous hemorrhage. The posture of the patient during the operation should not be overlooked. Hemorrhage will be less free if the patient's head and body are well elevated. It is a very good plan to make the incision section by section, stopping to control the hemorrhage from one section before proceeding to the next. Observations should be made upon the blood pressure immediately before and at frequent intervals during the operation. The object of this is twofold. In the first place, it is the most reliable index of the patient's condition. When the normal blood pressure is sustained throughout the operation we are assured that the operative procedures have not been of sufficient gravity to induce shock. This applies, of course, to operative procedures generally, and is not confined to those upon the brain; but in operations upon the brain the blood-pressure index is of much greater significance in that it assists us in determining whether the operation should be performed in one or two stages.

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[1] St. Petersburger med. Woch., No. 1, p. 1.

[2] Revue française de médecine et de chirurgie, 1904, No. 55.

[3] American Journal of the Medical Sciences, February, 1904.

Von Bergmann recommends the two-stage operation in cases in which the patient's general condition was below par, or in which the tumor was a very large one, while Horsley recommends its adoption in every case without exception. It seems to me that the former's recommendation is too indefinite and the latter's unnecessarily radical. A rule may be formulated which is based on a more scientific basis, namely, that when after the relief of pressure such as would follow the removal of the osteoplastic flap and the reflection of the dura, there is a very decided fall in the blood pressure, an attempt should not be made at that sitting to remove the tumor. Lumbar puncture, as a means of relief of pressure, is a procedure not only dangerous, but affords only temporary relief. A considerable number of fatal cases have been reported in which lumbar puncture has been practised for the relief of tension in the presence of cerebral tumors.

Bulging of the brain is the most embarrassing feature of cerebral operations. A distinction must be made between that which occurs immediately after the reflection of the dura which I have termed "initial" bulging, and that which follows as a result of subsequent exploratory manipulation, namely, "consecutive" bulging. Initial bulging is due to the increased tension exerted by a tumor. It is not always present, it is often not excessive, and is not likely to be followed by consecutive bulging. Consecutive bulging is due to the cerebral œdema set up in normal brain tissue by the trauma inflicted by exploratory manipulations. It exceeds in magnitude initial bulging, and suggests the absence of a tumor of considerable size at the seat of operation. If a tumor was present at the area of the brain exposed, unless existing under great tension, there would naturally be no bulging, and it is quite natural to assume that manipulations of the growth would not give rise to an œdema, which accounts for the bulging in normal brain tissue. In order to avoid this consecutive bulging, which is, to say the least, the most embarrassing feature of these operations, exploration should be carried out in the most expeditious manner, and there should be as little handling as possible of the exposed cerebral tissue. When the edges of the dural wound cannot be approximated without undue tension or without great laceration of brain substance, the gap should be closed by a graft taken from the pericranium, providing the tumor has not been found and there is reason to question the accuracy of the diagnosis. When there is every assurance of a tumor being present, but it proves to be inoperable or was imperfectly localized, no attempt should be made to close the dura, as in so doing the best possible palliative effects of the operation would be counteracted. Palliative operations should be regarded not merely as operations of propriety, but should be considered imperative whenever the tumor cannot be found or cannot be removed. A statistical study of the results of the last five years is encouraging. The mortality, both immediate and subsequent, has been reduced materially. Recurrence after operations for malignant growths of the brain is no greater than after operations for malignant growths of other structures.

The records of four operations for brain tumor are appended, and illustrate a number of points to which attention has been drawn.

Tumor of the Lateral Ventricle. McCosh[1] performed a craniotomy upon a patient of Dr. Ledzynsky, who was supposed to have a tumor of the superior parietal convolution. The presence of complete astereognosis and the absence of paralysis pointed to a lesion in that region. But in addition there were evidences of intense intracranial pressure, such as headache, vomiting, delirium, papillitis, and blindness, and also evidence of an irritative disease affecting the right Rolandic area. When the dura was reflected the brain bulged forward very prominently; a hollow needle was inserted, and at the depth of one and one-half inches withdrew about two and a half ounces of clear, straw-colored fluid. Upon withdrawal of the fluid the brain collapsed within its normal boundaries; the dura was sutured and the flap replaced. The patient died four weeks after the operation from lobar pneumonia, and at the autopsy a tumor about the size of an egg was found springing apparently from the wall of the ventricle. Two organized clots were found in the ventricle. Although the tumor was not found, the pressure and irritation symptoms were relieved by the continuous and abundant escape of cerebrospinal fluid.

Sarcoma of the Brain. The patient exhibited signs of a localized lesion, which was chiefly convulsive in the left arm, sometimes extending to the leg, leading to hemiparesis, associated with high-grade choked disk. The lesion was supposed to be either a traumatic cyst or a tumor. At the site of a scar, which was the result of a previous accident, Lufman[2] opened the skull, and found a spindle-cell sarcoma about the size of a walnut. Fourteen days later the convulsive seizures recurred, and the dura was laid open again and more tissue excised. At first the results were exceptionally good, but later several epileptic seizures and paresis of the right arm and right leg supervened; a hernia cerebri developed, and the growth recurred. The development of the sarcoma at the site of the original injury suggests the influence of trauma upon the etiology of the tumor.

Tumor of Optic Chiasm. Quite a large number of tumors of the optic chiasm have been reported. A large number of these are associated with acromegaly. I know of no case in which an attempt has been made even to expose a tumor of the chiasm. Kiliani[3] reports a case of tumor of the chiasm in which he had intended to make the attempt to explore and remove the tumor, but a day or two before the operation was performed the entire clinical aspect of the case suddenly changed. It was thought that the additional symptoms were due to rupture of the tumor and to a hemorrhage into the lateral ventricle. On this basis an osteoplastic flap was reflected and the ventricle punctured. No blood was found, however, and the patient died a few hours after the operation. The autopsy revealed a tumor of the hypophysis the size of a plum. The author made some observations on the cadaver with reference to the feasibility of reaching tumors of this region. He states that it would be impossible to reach this region by the temporal route. "Even if we should succeed in reaching the anterior foramen lacerum, between the carotid canal and the foramen ovale, we would find ourselves behind the sella turcica, in fact, behind the processus clynoidus posterior." Several years ago the author tried to apply a modified operation after Kronlein's method for reaching the rear parts of the orbit by combining it with a large frontal flap. It was intended to reflect downward the frontal flap, and to bring with it the entire upper roof of the orbit. This was tried in one case, but the operation had to be discontinued, as it was found impossible to break the bone in the way above described. From his experience Kiliani believes it impossible to reach the chiasm by any extradural operation, chiefly because of the density of the attachments to the dura. The following method he believes to be the only rational one: It consists essentially in the reflection of a Wagner flap of omega shape; the base lies about one-half inch behind the coronary suture; the flap would measure five inches in the median line, seven inches in width, and three and a half at the base. After the reflection of the bony flap the longitudinal sinus, which at this point is not larger than a medium-sized vein, is ligated and a dural flap fashioned. With this exposure the frontal lobe can be elevated and the optic nerve exposed without any difficulty. If a tumor be found the method of removal will depend somewhat upon its character. As a rule, most of the tumors are benign and easily excised with a sharp spoon; some are cystic, and, therefore, easily evacuated, and, finally, others may be malignant The latter offer naturally the greatest obstacles.

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[1] Medical Record, January 30, 1904.

[2] Berliner klin. Wochenschrift, No. 36, 1904.

[3] Annals of Surgery, July, 1904.

Sarcoma of the Dura Mater. An extensive operation was performed upon one of Griffith's cases[1] for the removal of a rapidly growing sarcoma of the dura. Two months later the growth recurred; the x-rays were applied and Coley's toxins injected into the back and directly into the tumor, but without any effect. The growth covered the whole top of the brain and elevated the vault of the skull, but despite the immense proportions of the growth the patient suffered comparatively little discomfort.

In the Augusta Hospital, Müller[2] has met with two cases of sarcoma of the dura in the occipital region. Both cases appeared in young men about the age of twenty, in whom the tumor had burrowed through the skull directly at the torcular herophili. The operation was in both cases divided into two stages, at first removing the overlying bone, then extirpating the tumor. In the first case it was necessary to ligate in two places and resect about 5 cm. of the straight or lateral sinus and a portion of the tentorium. This large defect was later covered with bone and healed satisfactorily. In the second case it was necessary to throw a double ligature around the transverse sinus. The operation was carried out at one sitting, and the patient died on the fourth day. In the first case a hemianopsia developed, which was attributed to the traumatic softening of the right occipital lobe; in the second case, soon after the operation, a central scotoma developed and led to bilateral amaurosis.

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[1] Medical Record, May 9, 1903.

[2] Zentralblatt für Chirurgie, No. 25, 1904, p. 766.

Angioma of Pia Mater. Bail[1] reports an unusual form of tumor of the brain occurring in a boy aged ten years. The patient in December, 1902, had a fall and struck the back of his head, without giving rise to any evidence of concussion. Two weeks later unilateral spasms appeared and still later there were evidences of choked disk. At the operation Krause found in the region of the left anterior central fissure the veins of the pia very much distended, confluent, and tortuous, involving a portion of the brain about 4 cm. in diameter. The thickened veins of the pia were ligated at the periphery and divided. The puncture and exploratory incision of that portion of the brain failed to find any tumor. After the operation the convulsions ceased, the choked disk disappeared, but the weakness which was present before the operation remained. The case was regarded as one of beginning angioma of the pial veins.

Cerebellar Tumors. NEUROFIBROMA OF THE ACOUSTIC NERVE. This contribution to the surgery of neurofibroma of the acoustic nerve by Hunt, Fraenkel, Woolsey, and Elsberg[2] is based upon the report of two cases, in both of which the diagnosis was correct and in both, unfortunately, the operation was a fatal one. As to the symptomatology one would expect the initial and most important symptom to be referable to a disturbed function of the auditory nerve. The growth of a neurofibroma is slow, and the conductibility of the nerve fibres is maintained for a considerable time. When signs of disturbance of the function of the nerve make their appearance the lesion might be suspected, although a certain diagnosis would be impossible. Not until the tumor grows and presses upon adjacent structures, as the pons, medulla, cerebellum, and nearby cranial nerves, can these tumors be recognized. The symptoms may be arranged in three groups: 1. General: headache, vertigo, vomiting, optic neuritis, bradycardia. 2. Focal: peduncular ataxia, cerebellar ataxia, lateroexpulsion, hemiasynergy, homocontralateral and crossed paralyses of the extremities; paralysis of the basilar cranial nerves, especially the seventh, sixth, and fifth; dysarthria, dysphagia, nystagmus, paralysis of the conjoint movements of the eyes, inequality of the pupils, and attacks of Adams-Stokes syndrome. 3. Special: serious impairment of the function of the auditory nerve of long standing and gradual onset. The first case, reported by Hunt, is that of a man, aged fifty-two years, whose history and condition is summed up as follows: Onset and initial symptom six years before, with tinnitus aurium and slowly progressive diminution of hearing in the left ear; two years later a tendency to stagger, occipital headaches, vertiginous seizures, and fainting spells. Up to the year previous to admission all the symptoms had gradually increased in severity. There was marked disturbance of the gait and equilibrium, and deafness in the left ear. Severe occipital and frontal headaches with vertigo and failing vision were also present. The symptoms on admission were cerebellar and peduncular ataxia, with a tendency to fall backward and to the left. There were also double optic neuritis, lateral nystagmus, dilated and unequal pupils, dysarthria, paræsthesia, and objective sensory disturbances in the distribution of the left fifth nerve, paresis of the left seventh, with electric changes, and nervous deafness in the left ear. Based on the duration and chronological relation of the symptoms, the clinical diagnosis of a neurofibroma of the left acoustic nerve was made. The operation was performed by Woolsey. The usual opening in the skull for cerebellar lesions was made, and on reflection of the dura the hemisphere bulged considerably. The seat and size of the tumor was easily made out by digital exploration; it was hard and nodular, and could easily be distinguished from the surrounding brain tissue. It was not thought feasible to remove it entire; hence it was removed piecemeal. This necessitated the frequent introduction and removal of the fingers, which caused some laceration to the cerebellar tissue. A large cigarette drain was introduced down to the seat of the growth and the wound closed. During the removal of the growth the respirations became irregular in rhythm and depth. About three hours after the operation the patient went into collapse and died. The autopsy showed that death was due to hemorrhage within the left middle peduncle of the pons, and Woolsey was convinced that this was due to the traumatism indispensable to the frequent introduction and withdrawal of the finger, especially in withdrawing the finger, as it had to be bent at the end to remove the fragments. The operator believes that it would have been possible and very much safer to introduce a curved vulsellum forceps along the finger, and, seizing the tumor, to remove it *en masse* after the finger had been withdrawn. Had this procedure been adopted the fatal injury to the pons might have been avoided. The tumor was approached from a posterolateral rather than posterior direction. By this route the distance to the cerebellopontile angle is shorter than from any other point in the cranial surface, and an excellent exposure of the tumor and the field of operation is obtained. It is an open question, however, whether this holds good in the living subject, since the increased intracranial pressure causes such a bulging in all directions that the condition differs materially from those on the cadaver. In Woolsey's opinion the surgical removal of these tumors is quite feasible, and its successful performance may be expected in a fair proportion of cases.

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[1] Zentralblatt für Chirurgie, 1904, No. 25.

[2] Annals of Surgery, September, 1904.

The report of the second case was made by Dr. Fraenkel, and may be summarized as follows: Male, aged forty-eight years. Disease began five years ago, with progressive diminution of hearing on right side. One year later difficulty of locomotion. Right lower extremity affected first. One year later increase of locomotion difficult; gait of drunken man. Transient diplopia and propulsion. Two years ago noticed the occurrence of an ankle clonus. Since two years impairment of vision and difficulty of speech and ataxia. Since one year sphincteric difficulties. On examination static and locomotor ataxia; falls and inclines to left side; tenderness in right mastoid region; some mental apathy; stammering speech; bilateral choked disk; nystagmus; paralysis of right side of face (developed four months after admission); motor paresis and spasticity of left-sided extremities; some spasticity of right side and marked right-sided ataxia. The diagnosis of neurofibroma of the acoustic was the only one possible to reach. In view of the fact that the optic neuritis had not reached a stage incompatible with the expectation of improvement, operation was advised. A preliminary craniotomy was performed by Elsberg, but, unfortunately, the patient died in uræmic coma forty-eight hours later, and the autopsy confirmed the accuracy of the diagnosis. Speaking more in detail of the operation, Elsberg calls attention to the fact that in reflecting the dura the cerebellum bulged more than normal, and its pulsation was only slightly visible. It was decided in this case to divide the operation into two stages. Accordingly, after the bone was removed, the cutaneous flap was replaced and the patient returned to the ward. At the conclusion of the operation the patient's condition may be said to have been fair, although his pulse began to weaken as soon as the incision in the soft parts had been made. In spite of energetic treatment the kidneys of the patient failed to respond and he gradually went into a uræmic condition, became comatose, and died forty-two hours after the operation. The opening in the skull in this case was somewhat larger than usual, extending above the level of the lateral sinus, and well into the mastoid cells. Elsberg believes that this gives a better opportunity for the exposure and necessary manipulations for tumors of the anterior and lateral parts of the cerebellum. The posterior or occipital route is objectionable, first, because it is not the shortest route from the surface of the skull; secondly, because the manipulations in the removal of the tumor have to be done by the sense of touch alone; thirdly, because even with the most gentle manipulations the cerebellum is apt to be considerably contused and its tissues injured; and lastly, in the digital examination of the anterior parts of the cerebellum from the posterior surface of organ the finger must come in frequent contact with the medulla and the pons. The great danger from only slight injuries to these structures is well known. In measuring a number of skulls to prove these points, Elsberg found that the distance from the outer surface of the occipital bone below the level of the lateral sinus to the anterior edge of the cerebellum diminishes steadily as one makes measurements more and more distant from the median line. On the cadaver, if an opening in the skull is made in the mastoid region and the dura incised, the lateral edge of the lateral lobe of the cerebellum falls away from the posterior surface of the petrous portion of the temporal bone, so that one-half of this part of the bone can be seen, and with only slight retraction of the lateral lobe can be drawn sufficiently toward the median line to expose the auditory and facial nerves. In summing up the conclusions drawn by their observations upon these cases the authors say: "We believe that the acoustic tumor syndrome is well defined, and that the diagnosis can be made with practical certainty. This presupposes not only the diagnosis of the location of the tumor, but its nature and comparative size. It must, however, be observed that other slowly growing pathological conditions in the posterior fossa might simulate closely this condition. The slow and essentially benign nature of the growth, its non-infiltrating character, and enucleability would all favor surgical interference. The deep situation at the base in immediate proximity to vital centres offers *very serious obstacles*. From personal observation we believe that the surgical technique should be perfected along the following lines: The avoidance of undue concussion in the removal of the bone and enlargement of trephine opening; a method of extirpation by which the tumor could be extirpated without undue manipulation of the surrounding parts; the division into stages, as recommended by Horsley, and celerity of execution. The study of the literature of this subject is unsatisfactory, because most of the cases are recorded under the heading of cerebellar tumors.

Fry reports a case of cerebellar tumor which was removed by Dr. Mudd.[1] The tumor, a conglomerate tuberculous growth, was situated in the substance of one of the hemispheres and was easily enucleated. A little over a year after the operation the patient reported himself as hearty as a harvester, although all the symptoms had not entirely disappeared, and a hernia cerebelli had developed. Mudd recommends the insertion of a silver plate to prevent the development of a hernia.

CRANIAL SINUSES.

Sinus Pericranii. This lesion, which is a very rare one, was first described by Stromeyer as a tumor under the pericranium, containing venous blood and in communication with the cerebral sinuses, either directly or through the medium of the channels in the cranium. Littauer[2] reports a case of this character which is only the tenth to appear in literature. Two weeks after the patient had received a blow on the head, which at the time did not seem to be serious, he noticed a soft swelling in the right temporal region. The swelling appeared only when he was in the stooping posture, and disappeared when he assumed the erect posture. The lesion was attributed by the author to a rupture of a diploic or emissary vein, in which repair of the wound was prevented by the formation of dense adhesions between the vein and the adjacent structures.

Cavernous Sinus Thrombosis. A very valuable contribution to the surgery of the cavernous sinus by Dwight and Germain was reviewed in the March issue of PROGRESSIVE MEDICINE, 1903. These authors were the first to demonstrate that this sinus was not, as formerly supposed, inaccessible, and that a thrombosis of the sinus could be treated by the same surgical principles as applied to the lateral sinus. Roth[3] reported three cases of cavernous sinus thrombosis all of which terminated fatally without any attempt at relief by surgical intervention. The primary cause was in each instance trivial: in one a carious tooth, in another a furuncle on the nose, and in a third a furuncle on the upper lip.

Thrombosis of the Sigmoid Sinus. In Bacon's case[4] the thrombosis was attributed to an injury to the sinus during a mastoid operation. A week after the operation the patient became septic, the wound was reopened, and a thrombus was found in process of formation and removed. Recovery was uneventful. Inasmuch as the clot had not broken down, Bacon did not think it necessary to ligate the internal jugular vein.

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[1] Journal Nervous and Mental Diseases, March, 1904.

[2] Berliner klin. Wochenschrift, May 30, 1904.

[3] New York Medical Journal and Philadelphia Medical Journal, February 27, 1904.

[4] Ibid., October 1, 1904.

CRANIAL NERVES.

Trigeminal Neuralgia. There were three papers upon this topic, each containing some features of interest, presented to the Surgical Section of the American Medical Association. Sherman[1] reported his experience in four cases, in two of which the results were unconventional and in two exceptional. The exceptional element in one of these was a paralysis, complete and permanent, of the facial nerve, noted first the morning after the operation. Sherman was quite sure that the nerve could not have been subjected to traumatism during the operative procedures, since the zygoma was not excised, and the nerve therefore well protected. The exclusion of trauma to the nerve in its superficial location put the case outside that class of which Pershing wrote, and to which Wyeth has referred, in which pressure or a pull on a superficial nerve during the period of anæsthesia resulted in temporary or permanent paralysis. The integrity of the nerve before the operation and the lack of any pathological ear or temporal bone process makes it most probable that some injury inside the skull caused the paralysis. Finally the operator was quite sure that he did not injure the nerve in the posterior fossa before it entered the petrous bone, so that he is quite at a loss to account for the facial paralysis.

The exceptional point in the second case was return of sensation and pain after division of the sensory root. For two days the man was free from pain and there was paralysis of the temporal and pterygoids, and on the third day the pain and sensation began to return, but the paralysis of the pterygoids persisted. Sherman is quite positive that he cut the root and concludes that the fifth nerve may unite and resume its physiological function. This result is quite contrary to the findings of Spiller and myself. Our investigations upon this subject, both experimental and clinical, seemed to prove beyond a doubt that regeneration was impossible. It seems to me within the range of probability that Sherman failed to sever the nerve completely, because of the early return of sensation. Had he reported a return of sensation weeks or months after the operation, one might then have some grounds for asserting that the nerve had undergone regeneration, but very grave suspicions are aroused at once when restoration of function is reported as having occurred on the third day.

Spiller[2] and myself have contributed a further report on division of the sensory root for *tic douloureux* based upon the observation of four cases. The advantages of this procedure over other procedures which have been substantiated by clinical experience are: (1) that it minimizes the amount of hemorrhage; (2) that its execution is comparatively simple; (3) that the adjacent structures (cavernous sinus; third, fourth, and sixth nerves) are not exposed to injury; and (4) that the mortality should be lower. The technique of the operation is practically the same as that for the extirpation of the ganglion up to the stage at which the superior aspect of the ganglion is exposed. The operation is completed by picking up and dividing the sensory root. Considerable importance has been attached to what has been called the infra-arterial route and the danger of injury to the middle meningeal artery. This, however, has been grossly exaggerated. One familiar with the great variation in the course of the middle meningeal artery and its relation to the temporal and frontal bone realizes at once the futility of attempting to establish a point below which one can operate always with the assurance that the vessel will not be injured. The danger of injuring the middle meningeal vessel in opening the skull is due to the fact that the vessel sometimes runs in a bony canal, sometimes in a deep channel. When the fragment of bone is removed the vessel is lacerated. Sometimes there is no canal at all; usually the canal begins sufficiently high to escape injury; exceptionally, however, the canal begins so far down that it would be impossible to make an opening large enough to enable one to carry out the necessary manipulations on the ganglion by the so-called infra-arterial route. Common sense prompts one to make the opening as near the base of the skull as possible, not especially to avoid the artery, but in order to reduce to a minimum the distance from the margin of the skull to the ganglion and to make the opening only as large as the manipulation may require. No other directions to the operator are necessary; he avoids injuring the artery if he can, and if he cannot it is a matter of no difficulty to control the hemorrhage.

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[1] Journal of American Medical Association, October 1, 1904

[2] Ibid.

Van Gehuchten has published recently[1] a most instructive and interesting paper on the "Surgical Treatment of Trifacial Neuralgia," in which he discusses somewhat at length the effects of division of the sensory root. Owing to the fact that he believes this operation to be as radical in effect as extirpation of the ganglion, he has styled the former "physiological extirpation" of the ganglion and regards it as both less dangerous and more complete than the operation of Krause. Every fibre of the central nervous system, he says, attacked by secondary degeneration is a fibre inevitably lost. The nerve fibres of the central nervous system interrupted at any part never regenerate. The section of the large root of the trigeminal nerve is equivalent, then, at least as regards its effects on the bulbospinal root, to the destruction or extirpation of the Gasserian ganglion itself. Whether the cause of the trifacial neuralgia resides in the semilunar ganglion, or in one or the other of the three peripheral nerves, at the moment we interrupt completely all communication between the ganglion and cerebrospinal axis we destroy inevitably the route by which painful impressions are conveyed to consciousness. The section of the large root of the trigeminal nerve, even though it does not constitute an anatomical extirpation of the semilunar ganglion, is equivalent, then, to a true physiological extirpation, and is the only one which is of importance in point of view of treatment of trifacial neuralgia. This physiological extirpation is not only more complete and easier to accomplish than the tearing out of the ganglion recommended by surgeons, but it has an advantage over this mode of operation which is not to be despised. It leaves intact the connections of the ganglion with the peripheral organs.

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[1] Le Nevraxe, vol. v.; University of Pennsylvania Medical Bulletin, April, 1904.

Noteworthy in the experience of Spiller and myself have been the absence of ocular disturbances. Although no especial pains have been taken to guard against corneal ulceration, this complication has not occurred. Spiller says it is probable that sympathetic fibres pass to the eye after entering the trigeminal nerve through the Gasserian ganglion, and as in division of the sensory root these fibres are not injured the danger of ocular disturbance by this operation is lessened. The trophic influences of the ganglion in the eye may depend possibly on the integrity of these sympathetic fibres, but it is probable that these fibres are not so numerous in man as in lower animals.

Van Gehuchten, in his recent contribution to the treatment of trifacial neuralgia, recommends the tearing out of the peripheral branches, a procedure which, he says, is simpler and much more easily executed than intracranial resection. This recommendation is based on the following phenomena: Simple division of a cranial nerve nearer to or farther from the base of the cranium is followed by degeneration of all the cells of origin, but with complete integrity of all or almost all of the fibres of the central end. This degeneration is only temporary, however, and is soon followed by reparation of the nerve and restoration of its function. Tearing out of the nerve, on the other hand, produces reactional phenomena much more intense; the degeneration that follows soon becomes an achromatosis, and this, in turn, is followed by atrophy and disappearance of all the injured cells. These phenomena have been observed only in motor nerves, and to prove whether sensory nerves would be affected in a similar manner, experiments were conducted on rabbits; the three peripheral branches were seized with a hæmostatic forceps at their exits from the supraorbital, infraorbital, and mental foramina and torn away. The results were positive; not only was there atrophy of the cells of the ganglion, but Wallerian degeneration of its bulbospinal root. As regards the technique of the operation, the nerve should be freed as far as possible from all its connections and seized as near as possible to the base of the cranium in order to make the resulting traumatism more intense. In reviewing the literature of the subject, Van Gehuchten found that this operation had been recommended and practised by Blum in 1881, and later by Doyen. There seems to have been some apprehension on the part of surgeons that there was danger, in employing the force necessary to tear the nerve, of inflicting some serious injury upon the brain centres. In any other cranial nerve this complication might occur, but the Gasserian ganglion is so firmly attached to the base of the skull that this accident could not be considered possible. These observations of Van Gehuchten are certainly worthy of the surgeon's consideration. If avulsion of the nerve will result in such degenerative changes of the ganglionic cells and the bulbospinal root that restoration of function is impossible, this operation should be practised as a substitute for the intracranial operations. Whether or no surgeons at large would be willing to practise in those cases in which a so-called central operation is indicated, it should at least be given a trial, when circumstances call for a peripheral operation; that is to say, instead of resecting a portion of the inferior dental or infraorbital nerve, the nerve should be forcibly torn away. If Van Gehuchten's observations are correct, it is reasonable to assume that there would be less chance of recurrence in the case of the latter than of the former operation. Not, of course, until this operative procedure has been proven successful in its application on the human subject can it claim the support of the surgical profession. Thus far, with the exception of a few isolated cases, it is supported only by the results of experimentation on rabbits. Davis, in 1898, operated on a case in which this idea of Van Gehuchten was put into practice, but with unfavorable results. The superior maxillary nerve was exposed as it ran from the Gasserian ganglion. The nerve, as it entered the bone, was grasped with a hæmostatic forceps and pulled upward; with another forceps the nerve was grasped closer to the ganglion and twisted loose from it. The relief which followed the operation was only temporary; the pain gradually returned and became so severe as to require a more radical operation. In commenting on the case, Davis says the explanation of the return of pain is left to the experts. The operation was practised in the manner prescribed by Van Gehuchten; it might be claimed that the twisting out of the nerve was not sufficiently violent or brusque, but this view is hardly acceptable.

Apparently without any knowledge of the investigations upon the sensory root operations, which have been carried on for the past four years and very generally discussed in the medical press both in this country and in Europe, Gordon, of Dublin,[1] puts forth the following as an original suggestion: "If the entire sensory root has been successfully torn from its attachment to the pons, nothing is more improbable than that the ganglionic cell should ever again establish a central connection. It seems then to me that the chief aim which the surgeon should have before him in performing this operation is the isolation and complete evulsion of the sensory root. You will remember that in the operation, as usually performed, the space of Meckel is opened by splitting the dura between the foramen rotundum and the foramen ovale, and the dissection of the ganglion is carried out mainly from before backward. Thus it happens that the operator reaches the sensory root as a final step in the operation, and when his mind is much fatigued, especially if, as in this case of mine, the dissection has been difficult owing to hemorrhage. My suggestion is that Meckel's space should be opened from the foramen ovale in a backward instead of a forward direction. The middle meningeal artery must, of course, be divided, but this is a matter of no importance. Having opened the space in which the ganglion lies in this way, I propose, in my next operation, to at once proceed to the identification and separation of the sensory roots. If, then, the evulsion is well done, I think one might leave both the ganglion and the nerve divisions untouched. Having put forth this suggestion, the main purpose of my paper is accomplished. The suggestion is briefly this: A complete evulsion of the sensory root will produce the same effect as removal of the ganglion, and the effect will be permanent. This being so, the operator should from the first aim at the isolation and evulsion of this sensory root, and it might simplify the operation to open the space of Meckel behind the foramen ovale and third division of the fifth nerve, instead of in front of it."

OSMIC ACID TREATMENT. About a year ago Murphy reported his experience with this treatment of a case of trigeminal neuralgia by intraneural injection of osmic acid—a mode of treatment recommended by Mr. W. H. Bennett in 1899. More recently Murphy[2] has carried on a series of investigations, both experimental and clinical, to prove the effectiveness of this procedure, chiefly because of the serious character of the intracranial operations. In the twelve intracranial operations which he has performed the mortality was 33⅓ per cent. This rate of mortality is much higher, I believe, than that based upon the results of surgeons generally within the past five years. The technique has been so thoroughly elaborated that the operation is no longer regarded as one of a very serious nature. Out of 120 cases Horsley had but 3 deaths, a mortality of 2½ per cent. From Murphy's experiments and clinical experience he draws the following conclusions:

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[1] The Medical Press, March 30, 1904.

[2] Journal of the American Medical Association, October 1, 1904.

That trifacial neuralgia, *tic douloureux*, is not the result of a pathological entity which has so far been definitely determined. The tendency after all types of operation, with the possible exception of removal of the sensory root behind the ganglion, is to recurrence of the disease. This is probably due to the regeneration of certain nerve elements following the deep operation, and anastomosis and retention following the superficial. Sudden shocks and irritation to the terminal filaments of the trifacial not infrequently cause an immediate and occasionally a permanent cessation of the neuralgic pain. The mortality from the superficial exsections is practically *nil;* the mortality from the intracranial operations is great. The hazard is greater than should be taken in a disease which does not in itself jeopardize life. Injections of osmic acid in 1 to 2 per cent. solution into the nerve trunks relieve the pain immediately and in a large percentage of cases for a long period of time. The injections into the superficial tissue for peripheral neuralgia should be abandoned, as the nerve trunks are easily located, and there is no danger of superficial necrosis following such operation. It should never be injected into a motor nerve or a motor-nerve area, and, therefore, never into the spinal nerves, except in amputation stumps. It produces a local necrosis of the tissue into which it is injected, and even of the wall of the foramen. This necrosis does not suppurate unless the area is exposed to mouth infection. In that case the suppuration often continues for weeks, draining into the mouth, giving no special inconvenince, and in no way interfering with the final result. The best results are obtained with a 1½ to 2 per cent. solution; this should be injected in many places into the nerve trunk and also into the foramen. All of the nerve branches should be injected—the palatine, lingual, mandibular, superior maxillary (infraorbital), and supraorbital. They can all be exposed through mouth incisions except the supraorbital. Many times there are three or four divisions of the supraorbital, and they should be searched for carefully and each injected. Occasionally it is necessary to inject the auricular branch. The posterior palatine is not so difficult to inject as one would at first imagine. The foramina can and may be injected without anæsthesia or incision. The procedure is quite painful, however, and is not certain in its results. The injections can be made with local or general anæsthesia. I prefer the general. The injection is free from danger. Judging theoretically from the experience with incisions, resections, and ganglion operations, the relief *should not be permanent after the injection of the osmic acid.* From clinical experience up to date, however, and particularly from Mr. Bennett's showing, the fact is that many cases *are* permanently cured. Time alone must determine the final result of this treatment. Its ease of application, its *nil* mortality, and its immediate results forcefully commend its use.

Eastman[1] treated a case successfully with injections of osmic acid. A 2 per cent. solution was injected into the supraorbital, infraorbital, and dental nerves. The symptoms abated one week after the operation, and have not recurred.

According to Wright,[2] Billroth and Neuber were the first to employ osmic acid for neuralgia. They used repeated injections through the skin without exposing the nerve. Wright believes the method should have a further and extended trial, and has himself employed the method in a series of twelve cases. The immediate results as regards the harmlessness and at least temporary relief quite justify the use of the plan before resorting to such a severe procedure as excision of the Gasserian ganglion. Most of his cases are much too recent to attempt to draw any conclusions as to the permanent value of the method. His results were as follows: 1. Fifth nerve; improved; two and three-quarter years since operation. 2. Cervical; great improvement; three and one-half years. 3. Testicle; improved; two years. 4. Fifth nerve; one attack since; otherwise better; fourteen months. 5. Fifth nerve; relieved; one year. 6. Tibial; failure; ten months. 7. Fifth nerve; much relieved; ten months. 8. Fifth nerve; relief; lost sight of. 9. Fifth nerve; failure. 10. Fifth nerve; relief; three months. 11. Cervical, with torticollis; temporary relief; two weeks. 12. Fifth nerve; well; two months. 13. Fifth nerve; well; six weeks.

Excision of Gasserian Ganglion. Schwartz[3] reports two cases of excision of the Gasserian ganglion according to the Krause method. The first case was a woman, aged forty-two years, who had previously undergone an operation for the avulsion of the infraorbital nerve and a resection of the superior maxillary nerve at the foramen rotundum. The second was a man, aged sixty-four years, who had undergone several peripheral operations. The author carried out the technique of Krause with one modification, namely, the preliminary ligation of the external carotid artery. In the first case a complete ophthalmoplegia of the affected side was observed after the operation, but which disappeared in a few days with the exception of a paralysis of the abducens. Corneal ulceration did not appear. In the second case, immediately after the operation, there appeared a paralysis of the abducens, lagophthalmos, and later on corneal ulcerations.

Prat[4] has recently published a very creditable monograph upon resection of the Gasserian ganglion containing an historical sketch and the anatomical relations. The majority of the monograph is taken up with the operative technique. The work is based upon two cases coming under the author's observation, and contains a careful tabulation of all cases hitherto reported in literature.

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[1] Journal of the American Medical Association, September 24, 1904.

[2] Medical Chronicle, fourth series, vol. vi.

[3] Liecnicki viestnik, 1904, Nr. 2 u. 4

[4] Thèse de Paris, 1904.

OCCIPITAL OR RETROMASTOID ROUTE. In a review of the various surgical procedures for the removal of the Gasserian ganglion Armour[1] refers to a method of approaching the sensory root suggested by Ramonède, which the latter called the "occipital or retromastoid" route.

An incision, which includes the soft parts down to the periosteum, commences 1 cm. above the tip of the mastoid process and in the centre of its cutaneous surface, and passes upward just behind the commencement of the temporal ridge. Curving backward it reaches its highest point, 3 cm. above the superior curved line of the occiptal bone, and then passes downward, at a distance of about 4 cm. from the external occipital protuberance. A flap of periosteum is then turned down. The posterior border of the mastoid process and the asterion are thus laid bare. An opening in the skull is made, reaching upward 1 cm. above the asterion and in front nearly to the mastoid process. In the upper and the anterior part of the opening is seen the lateral sinus. A semicircular incision is made in the dura along the bend of the sinus and a short distance below it. The cerebellum is retracted and the root of the fifth nerve reached at the apex of the petrous bone, avoiding in so doing the seventh and eighth nerves lying below and at a lesser depth. The nerve is isolated by means of a blunt hook, care being taken to avoid wounding the sixth nerve lying beyond it. The sensory root is severed and the peripheral end torn away. This suggesiton is a perfectly feasible one, although in the majority of cases would be attended with greater difficulties and in inexperienced hands with greater danger than the operation in front of the petrous bone. The root of the fifth nerve passes from the cerebellum to the groove in the petrous bone near the cerebellopontile angle—a region in which the manipulations must be conducted in a very delicate manner in order to avoid inflicting an injury on the pons. In a case of a suspected cerebellar tumor upon which I was operating for Dr. C. K. Mills, the latter suggested that if the tumor could not be found I should cut the sensory root to relieve the patient of the intense neuralgia from which she was suffering. A cyst was found and evacuated, and the patient recovered and was relieved of her pain. At that operation I was able to demonstrate to the bystanders the fifth, seventh, and eighth nerves.

Intracranial Resection of the Superior Maxillary Division. Three years ago Hutchinson[2] advanced the proposal that the so-called excision of Meckel's ganglion (always a difficult and uncertain procedure, involving disfigurement of the face) should be given up for intracranial division of the superior maxillary trunk just above the foramen rotundum. The recommendation was based on the following considerations: "1. The more central the operation, the more certain is the prospect of permanent cure. 2. In almost every case of peripheral operation, including excision of Meckel's ganglion, the neuralgia has returned. 3. The surgeon who works through the walls of the antrum to the pterygomaxillary fossa is greatly hampered by the depth of the wound, as well as by hemorrhage from the internal maxillary artery. He may succeed in defining the superior maxillary nerve in the upper part of the fossa, but he is likely to fail. 4. A depressed scar in the middle of the cheek is much more disfiguring than one hidden by the scalp. In the middle fossa of the skull the whole of the superior maxillary trunk, before it gives off any branches, can be exposed, and a considerable portion of it (one-third to one-half inch) can be excised, so that there will be no chance of subsequent union." Hutchinson believes the intracranial route is at least as easy as the facial one, and without doubt it affords more certain access. It is to be preferred to the operations of Lücke, Billroth, or Kocher, which, as Treves has said, are "all needlessly severe and involve wounds of great and unnecessary magnitude." There is reason to believe, further, that the results of intracranial division will be more lasting than those of extracranial division. In five of Treves' cases the pain recurred in from twelve months to three years, and in but three of twenty cases of Kernochan's operation was relief permanent.

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[1] Practitioner, June, 1904.

[2] Lancet, April 16, 1904.

Extracranial Division of Second and Third Division. Broekaert[1] regards the extracranial operations as preferable to intracranial operations in the treatment of trigeminal neuralgia, and has tried to devise a method whereby the trunks of the second and third divisions may be approached at their exit from their respective foramina, and forcibly torn from the ganglion. The mode of procedure, which he elaborated upon the cadaver, is too complicated to describe, and I believe would be equally difficult to perform.

Classification of Trifacial Neuralgias by Cocaine Injection. The ability to determine whether the lesion is confined to the peripheral nerves or to the ganglion or to the central nervous system—that is, whether the pain is of peripheral, ganglionic, or central origin—has long been sought for by surgeons as a means of deciding whether, in a given case, the extracranial or the intracranial operation was indicated. Verger[2] classifies his cases, twenty-three in number, according to Petres' method by their behavior to injections of a 2 per cent. solution of cocaine. If the injection of cocaine into the painful place stops the neuralgia crisis for a time, the cause is probably in the periphery; if the injection does not modify the crisis, the cause is higher up in the roots or ganglion. The injection must be made between the paroxysms, so as to prevent their appearance, if any value is to be attached to its use. In ten of his cases the cocaine had no effect.

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[1] Bull. de l'Académie royale de médecine de Belgique, Brux., iv. serie, tome xviii., No. 1, January, 1904.

[2] Revue de médecine, January, February, 1904.

Lesions of the Accessory Sinuses of the Nose. Possible Etiological Factors in Tic Douloureux. At the last meeting of the Medical Society of the State of New York, Snow, of Syracuse, reported a series of cases of *tic douloureux* and other facial neuralgias which had been cured by treatment of the intranasal structures and of the accessory sinuses of the nose. In some of these cases serious operations had already been performed with only passing success. It does not seem likely that such degree of pressure as would be exerted upon the delicate nerve endings by collections of fluid in the sinuses would be sufficient to give rise to the paroxysmal pains of major tic. Infection of the sinuses may, of course, be the exciting cause of an ascending peripheral neuritis, which would lead eventually to a true *tic douloureux*.

Division of the Auditory Nerve for Tinnitus Aurium. Several years ago Krause demonstrated the feasibility of dividing the eighth nerve in the cerebellar fossa, and recommended this treatment in obstinate cases of tinnitus aurium. Recently Wallace[1] attempted this operation upon a patient who suffered from a very aggravated type of this condition. The operation had been practised several times on the cadaver before it was undertaken upon the patient. The complete operation for mastoid caries was first performed, exposing the lateral sinus and removing the posterior wall of the meatus down to the level of the facial canal. That portion of the temporal bone, forming the wall of the mastoid, was next removed, starting from the groove for the lateral sinus and extending forward and upward as far as the horizontal semicircular canal to the remains of the posterior wall of the meatus. The extent of dura mater in front of the lateral sinus exposed by this means was about three-eighths of an inch. The anterior edge of the exposed part of the dura was then incised to about the extent of one inch; the lateral sinus gave considerable trouble. It was much distended and protruded in such a way as to suggest that the normal flow through it was obstructed. In removing the bone at the lower part of the wound bleeding occurred, which necessitated plugging and the suspension of the operation. The second stage of the operation was undertaken after an interval of one week. The anterior border of the exposed part of the dura mater was divided for a distance of about one inch. A retractor was introduced, but it was found that there was not sufficient room to expose the nerve owing to the resistance offered by the lateral sinus. This was, therefore, divided between ligatures. The cerebellum was next slowly pressed backward, but the continued flow of cerebrospinal fluid somewhat interfered with a good view of the parts. The auditory nerve was then picked up on a hook and divided. The patient enjoyed very little if any relief from the operation, lingered on, and died twenty-one days later. At the autopsy it was found that the auditory nerve had been divided with the exception of the strand as thick as a fine piece of cotton, which lay next to the facial nerve. The latter was intact. The cause of death was undetermined. The operator seems to have been annoyed to a considerable extent by hemorrhage from the surface of the cerebellum, and attributes his failure to divide the nerve completely to this complication. In my experience in cerebellar surgery hemorrhage from this source has never been troublesome. There is no mention made in the article of the suggestions of Krause and to the fact that he was the first to prove that the operation was feasible.

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[1] Lancet, April 30, 1904.

Facial Nerve. THE TREATMENT OF FACIAL PALSY BY NEURAL ANASTOMOSIS. But little has been added to our knowledge of this important contribution to the facial nerve during the past year. In the March, 1904, number of PROGRESSIVE MEDICINE the subject was discussed very fully. But few additional cases have been reported, and in many cases the reports were published too soon after the operation to disclose the final results. Taylor and Clark[1] have put on record three cases in which the stump of the facial nerve was implanted into that of the hypoglossal. Of these, one was reported ten weeks after the operation, at which time the face was far less asymmetrical and the eye could be partly closed. There was no control of the muscles of the face. Six weeks after the operation on the second case it is said that the electric reactions show beginning regeneration of the nerve; but one month had elapsed since the operation on the third case, and no improvement could at that time be expected. Discussing the question as to whether the hypoglossal nerve should be divided transversely or a lateral anastomosis practised without division of the nerve, the authors say: "While the end-to-end suture gives the most active and complete regeneration, yet we felt scarcely justified in causing a permanent division of the hypoglossal. The difficulties of mastication, deglutition, and phonation present for the first few weeks in our three cases were of sufficiently marked degree to cause us to feel that the complete and permanent paralysis following transverse division of the nerve would be a serious drawback to the comfort and happiness of the patient. Case II. could swallow only liquid food for three weeks after the operation. In Case I. the boy's voice for several weeks sounded like that of a cleft palate, and many of the guttural words could scarcely be enunciated. Only three cases besides those in this paper are recorded, and they are all of such recent date that the ultimate results are still problematical. A larger number of cases and a sufficient lapse of time, so that final results can be compared, will give us a reasonable basis for determining whether the patient is better off with a more complete return of power in the facial supply with permanent paralysis of the hypoglossal or whether, on the whole, he is better off with a somewhat less complete control of the facial and only a temporary disturbance of the hypoglossal. It seemed to us, meanwhile, the part of conservative surgery to approach the subject from the standpoint of doing as little additional damage to the patient as possible until we could see what was to be the result." Though my experience with this operation has been limited, I have never seen any difficulty in swallowing or phonation following division of the hypoglossal nerve when the latter has been divided for anastomosis with the facial nerve, or when it has been necessary to remove the nerve in extirpation of malignant growths. The advantages of this procedure, to my mind, outweighs the disadvantages. End-to-end suture is a simple operation; the re-education of the cortical centre is easier if it has only the new group of muscles to work on, and end-to-end suture causes more active regeneration.

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[1] Medical Record, February 27, 1904

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In twenty-two attempts to restore the function of the nerve by anastomosis in cases of facial paralysis, according to Munch, seven failed. Among the successful cases the results of Kennedy and Körte were the most gratifying. In a man, aged thirty years, who was suffering from facial paralysis as a result of chronic middle-ear disease, Mintz[1] effected an anastomosis between the facial and spinal accessory nerve. The method adopted was an end-to-end suture. The central portion of a branch of the spinal accessory was sutured to the peripheral stump of the facial. In order to facilitate the operative procedures the author divided the posterior belly of the digastric muscle. Two months after the operation the patient could close the lids completely, and in the further course of events the motor function of the entire left side of the face was restored. Some of the movements were associated, as, for example, when the patient closed his left eye, the entire musculature of the face, including the platysma, was brought into play; the sternocleidomastoid muscle did not contract. It appeared that a disassociation in the centre for the spinal accessory nerve had already made itself evident.

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[1] Zentralblatt für Chirurgie, 1904, No. 22.

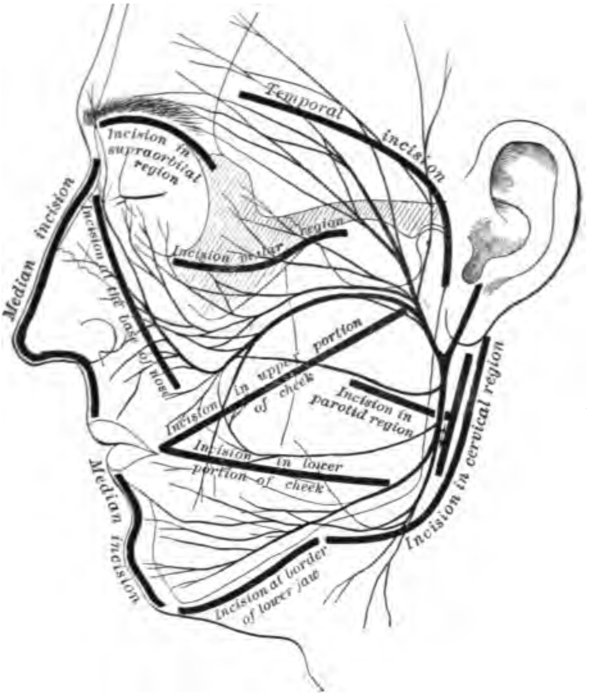
Temporal incision
Incision in supraorbital region
Median incision
Incision at the base of nose
Incision malar region
Incision in upper portion of cheek
Incision in parotid region
Incision in cervical region
Incision in lower portion of cheek
Median incision
Incision at border of lower jaw

Illustration showing the incisions which should be made in various regions of the face in order to avoid important branches of the facial nerve.

SUTURE OF FACIAL NERVE. Five months after an operation for removal of tuberculous glands of the neck, in which the nerve had been severed, Bristow[1] had intended to anastomose the facial to the hypoglossal nerve. He was fortunate, however, in being able to find the divided ends of the facial quite readily in the cicatricial tissue. With an electrode he was able to determine that, beyond a nodule of cicatricial tissue in the course of the nerve, electric stimulation gave a prompt reaction in the muscles. Accordingly he cut out the scar segment and sutured the two ends together. Two weeks after the operation he reports some slight evidence of regeneration. Renton[2] operated on a child who had had facial paralysis for three years, following mastoid disease. The mastoid and tympanic cavities were converted into one, according to the method recommended by Macewen and Ballance, and all the unhealthy tissue was removed. The cavity having filled in with granulation tissue by the end of a week, skin grafts were applied to close the defects. The patient was discharged, with instructions to return in a month with a view toward suturing the facial to the spinal accessory, but when she returned the paralysis had completely disappeared. The case illustrates the value of the operation recommended by Macewen and Ballance, and is also interesting as showing how promptly the muscles recover their function after having been paralyzed for three years.

ANATOMY OF FACIAL NERVE. The course and distribution of the facial nerve and its branches have been carefully worked out by Bockenheimer,[3] with especial reference to the incisions which may be required for various operative procedures in this region. The article is accompanied by diagrams (one of which is herewith shown) illustrating the advantages and disadvantages of the incisions which have been recommended from time to time by various operators, and to these is added such incisions which the author regards as superior in that they avoid the important branches of the facial nerve. The article is too long to be reviewed in detail, but it is worthy of study for those who are called upon any time to perform operations in the region covered by the distribution of the facial nerve.

Hydrocephalus. The operative treatment of hydrocephalus consists in drainage of the lateral ventricle. To be successful Taylor[4] says a method of drainage must be internal, slow, prolonged, or permanent. A small permanent fistula between the lateral ventricles and the subdural space would most closely resemble normal conditions. To meet these indications Taylor exposes the second temporosphenoidal lobe by an osteoplastic flap, and through this lobe he introduces a drain composed of six strands of forty-day chromic catgut bound together by a loose spiral of catgut and enveloped by three layers of Cargile membrane. The second temporosphenoidal convolution was chosen because through this the body of the ventricle may be drained, and because the drainage canal is in close proximity to the great lymph spaces and venous sinuses at the base of the brain. This point is to be referred to the dome of the brain or to the under surface of the occipital lobe. In the latter instance the brain tissue requires too much handling, and in the former the layer of brain tissue is so thin that the drainage material is retained in place with difficulty. Six cases were operated upon by Taylor along these lines, with the following results: Case I. is alive twenty months after the operation, with considerable mental but no physical improvement. Case II. was alive eleven months after the operation, and improved both mentally and physically. Case III. lived two months, and died of acute gastrointestinal disturbance. Case IV. died about sixty hours after operation, and unquestionably as the result of it. Case V. had apparently reacted from the operation by the fourth day, then developed otitis media, which drained satisfactorily; then, finally, anuria and death on the eighth day. Death probably would not have occurred at that time had no operation been performed. Case VI. died suddenly on the sixth day, when he had apparently been slowly recovering from the sharp reaction of the first three days. The wound was infected, but apparently not in the deeper tissues.

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[1] Brooklyn Medical Journal, June, 1904.

[2] Bristol Medical Journal, January 16, 1904.

[3] Archiv für klin. Chir., Bd. lxxii., Heft 3.—

[4] American Journal of the Medical Sciences, June, 1904.

After reviewing the various surgical methods of treating hydrocephalus, Ricketts draws the following conclusions: Excessive secretion of the cerebral meninges may occur in any form of animal life. The various forms of vegetable life are subject to excessive local or general secretion to a fatal degree. Hydrocephalus, ventricular or meningeal, may develop *in utero* or at any time throughout infant or adult life. The number of cases of spontaneous recovery in either are probably numerous, especially in infant life, where the arachnoid is alone involved. All cavities may unite with or without external rupture. When so, it is usually fatal. Spontaneous rupture may occur externally or subcutaneously, with an occasional recovery. The effusion may be into the lateral third or fifth ventricle, or it may be in the arachnoid cavity, one or all. A clot in the arachnoid cavity may cause a cyst, which will enlarge with all its consequences. Syphilis and rickets have been assigned as causes of hydrocephalus, but such have never been proven; cause yet unknown. Sometimes zones of new osseous material are seen scattered here and there in the meninges, and sometimes upon or in the brain substance. The septum lucidum is invariably thickened, as are the cerebral meninges in general. It is probably the greater number of cases of hydrocephalus, whether of the third or fifth ventricle, or of the arachnoid variety, that can be cured by some form of drainage. Continuous drainage by seton or the repeated use of the trocar has given better results in the way of benefit or cure. Spinal drainage has been practised to but a very limited degree, and as yet very undetermined. Subcutaneous drainage has not as yet resulted in a cure, but there seem to be many possibilities for this method. Trephining for drainage is only resorted to in cases where the fontanelles have been closed by bony union. Results from drainage are more favorable if it is done when the presence of fluid is first detected. It is sometimes necessary to drain both hemispheres together with the right and left cerebellar cavity. The secret of curing arachnoid hydrocephalus by drainage probably lies in obliterating the arachnoid cavity. However, this can hardly be so with hydrocephalus of the third, fourth, and fifth ventricular variety. The cardinal principle in this as in all operations upon the brain is asepsis.

Morton[1] adds another to the long list of fatalities following operation for the treatment of hydrocephalus. The mortality is said to be so near to 100 per cent. that no one surgical method has ever yet become an established procedure. The operation which Morton performed consisted in drainage of the ventricles into the subdural spaces. The operation was performed on both sides at an interval of about a month. The child died ten days after the second operation, with a temperature of 105°. An autopsy was performed, and the connection between the ventricles and subdural space was found to be uninterrupted on both sides, but, despite the fact that a communication existed between the ventricle and subdural spaces for some time, the hydrocephalus increased.

Lumbar puncture is efficacious in the treatment of hydrocephalus according to Löwenburg[2] only before ossification has taken place in the sutures or fontanelles—*i. e.*, before the second year—and only when there is a free communication between the ventricles and the subdural spinal space. Löwenburg, in the case of a child aged twenty months, withdrew by lumbar puncture 50 to 60 c.c. of cerebrospinal fluid once a week for a period of two months, when the child died of pneumonia following measles. The child's condition had improved both mentally and physically.

Epilepsy. At the last meeting of the National Association for the Study of Epilepsy and the Care and Treatment of Epileptics, two papers were presented bearing on the surgical treatment. Da Costa,[3] after calling surgeons to task for their lack of conscience and discrimination in their attitude toward epileptic subjects, suggests the following modifications of

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[1] British Journal of Children's Diseases, vol. i., No. 9.

[2] American Medicine, August 6, 1904.

[3] Medicine, February, 1904.

Sir Victor Horsley's classification as a common ground upon which the operative treatment may proceed: 1. Reflex epilepsy, the surgical treatment of which I shall not discuss. 2. The common, non-traumatic, idiopathic, or essential epilepsy, in which the attacks are general and are without a local onset. 3. Idiopathic epilepsy, with a local onset of attacks (focal or Jacksonian epilepsy). 4. Traumatic epilepsy. This may be subdivided into two forms: (*a*) attacks without a local onset, and (*b*) attacks with a local onset (focal or Jacksonian epilepsy). 5. Jacksonian epilepsy, due to gross brain disease (tumor, aneurysm, etc.). 6. Epilepsy following infantile cerebral palsy. 7. The posthemiplegic epilepsy of adults.

As to the treatment of *idiopathic epilepsy,* the uncomplicated cases should not be operated upon. If the epileptics suffer from persistent headache, a button of bone may be removed to relieve pressure; or in the status epilepticus, trephining with drainage of the lateral ventricle is justifiable. Kocher, believing operation is essential in epilepsy, on the ground that the condition is due to increased intracranial pressure. trephines the skull, cuts away corners of the dural flap to prevent reformation of bone, and drains the lateral ventricles with a silver tube. The objections to this operation are threefold: (1) the dangers of infection, (2) of hernia cerebri, (3) the fact that pressure is a result, not a cause, Jaboulay recommended excision of the sympathetic in essential epilepsy on the theory that the brain is anæmic and removal of the vasoconstrictor influence will produce a hyperæmia. This theory has practically been abandoned by neurologists, and the advocates of Jaboulay's operation now employ it upon the hypothesis that it produces a trivial hyperæmia and improves the nutrition of cells. In commenting upon this method Da Costa says the surgeon assumes an imaginary cause for the disease and combats this with a theoretical operation.

Idiopathic Epilepsy with Focal Symptoms. Most of these are due to cerebral infantile palsy, and if the case is seen within two years of the onset of the attacks, and from the very start the attacks had a local beginning, it is proper to trephine and excise the motor cortical centre. In adults, if the attacks are so frequent as to produce exhaustion and threaten life, here, too, the centre should be excised. This operation cures probably not more than 1 or 2 per cent. The prognosis would be better if one could prevent the formation of adhesions between brain and meninges, and for this purpose absorbable materials, such as the inner lining of an egg-shell or Cargile's membrane, rather than non-absorbable materials, such as gold or silver foil, should be used.

Traumatic Epilepsy. It may be laid down as a rule that when there has been an identified traumatism one is justified in operating at any time even after years, and that when traumatism has not left such definite evidences one is justified in operating at any time before the third year after the occurrence of the injury. Traumatic Jacksonian epilepsy gives a better prognosis than does any other form; the more time that has elapsed between the injury and the operation, the worse the prognosis. The prognosis is better when the attacks are not general, and better, also, when the injury occurs in the motor rather than the sensory area. When following an injury in the frontal region operation affords very little hope of success. Da Costa's views as to the surgical treatment of epilepsy are in accord with those of Jacobson, who says: "But while it is authoritatively proved that the value of trephining for traumatic epilepsy has been greatly exaggerated, owing to many operations having been ill-advised, and also, what is less excusable, to the premature reporting of successes, it by no means follows that this operation is to be abandoned; it is to be employed on more careful and more scientific lines. We should be careful in promising success, save in cases of recent injury, where there has not been time for the changes to occur, which, as we have seen, must render the occurrence of the convulsions after a time a matter almost of certainty. In other cases it will be only honest not to hold out much hope of cure, but to explain to the patients and his friends that the operation is more or less of an experiment; that its dangers are slight in experienced hands; that while cure, in the truthful sense of the word, is unlikely, some relief will almost certainly be granted in the number and severity of the fits; that in any headache, etc., from which the patient suffers it is impossible to state what the amount of relief will be until the parts have been explored; and, having said this, we shall be wise if we leave the decision in the hands of the patient or his friends. For as we know nothing of the actual causation of epilepsy in these cases, so we must rest uncertain as to the relief which a trephine opening on wide lines may give. If headache or optic neuritis is present it will be removed. As to convulsions, we may hope that in cases that are not of too long standing the relief to tension may help toward recovery the impaired vitality of cells so delicately constituted as those of the brain. In other cases the opening may allow of the intracranial circulation undergoing the fluctuations to which it is inevitably exposed without the unstable cortex centres becoming congested and irritated and prone to explosions, as would otherwise be the case."

Munro's[1] paper, the second of these contributions, contains the clinical records and the lesions found at the operations upon eleven cases. They are reported with the hope that, by the accumulation of data, someone in the future may be able to determine with greater accuracy which patients are likely to benefit by surgical interference. It is interesting to note that in practically every one of these cases there was some pathological lesion or abnormality found at operation, but only vaguely suspected beforehand. The cases were not under observation long enough to tabulate them on the score of benefit or cure, and the lesions were so variable that they could not be compared one with another. Several were either not helped or were worse after operation.

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[1] Boston Medical and Surgical Journal, February 4, 1904.

Some patients were doubtless temporarily benefited, but whether *post hoc propter hoc* is extremely doubtful. As Munro says, if we can see enough of cases of living pathology and eventually can group them according to the results, the duration of preoperative attacks, etc., and then compare them with the results in similar cases under constitutional treatment, we shall be better able to advocate surgical interference or medical treatment, as the case may be.

From a study of a series of 300 cases of operations for the relief of traumatic Jacksonian epilepsy, Delbet (Paris) draws the following conclusions: Operation should be performed as soon as possible after diagnosis is sure and that the symptoms do not result from any peculiarity or hysterotraumatism. Trephining is indicated even in very old and extremely serious cases. If there exists on the cranium evidence of a depressed fracture, an exploration should be made at that point and the thickened or depressed bone elevated. Elevation of the dura mater is not indispensable, but it is wiser to reflect this membrane and examine the condition of the brain. In cases where there is no depression a large osteoplastic flap should be reflected. The large flap permits of an examination of a wide area of the meninges and brain, and is of the greatest assistance in which there is uncertainty as to the seat of the lesion. Areas of meningoencephalitis should be resected, but the brain should not be touched or disturbed unless manifestly affected. The brain should be explored when no explanation of the condition is to be found on the surface. Operations are almost always successful when a superficial lesion or an inflammatory cerebral lesion is found. This is not the case when the lesions are degenerative in character. Second and even third trephinings have been successful when the first had failed.

A contribution to the surgery of the brain by Nast-Kolb[1] contains a record of three operations for patients with epileptic seizures and some interesting comments thereon. In all the cases there had been a history of trauma, and in all the convulsions were at first limited to one region of the body. The first case terminated fatally six weeks after the operation, as a result of a hernia cerebri and suppurative meningitis. After removing an osteoplastic flap and making a cross-shaped incision into the dura, a number of small cysts were found. They were as far as possible extirpated and the region tamponed. The brain had already shown a great inclination to prolapse, so that it was not possible to close either the dura or the osteoplastic flap.

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[1] Deutsche Zeitschrift für Chirurgie, Bd. lxxv., Heft 5–6.

In the second case the cortical centre for turning the head was isolated with a faradic current and excised. The section excised was 6 x 9 x 11 mm. The paralysis disappeared in a very short time after the operation, but in six months the convulsions recurred, and at a second operation an outgrowth from the bone was found, which might have been responsible for the recurrent attacks. This was removed, and the patient remained free from convulsions for seven months. In the third case the convulsions proved to be due to a tumor of the brain, a fibroma, which, however, was not recognized until the second operation.

It is often impossible to determine whether the point of injury corresponds exactly to the region of the brain affected. In two of the cases paralysis was observed. As to the operative technique, Krönlein's method of localizing the central fissure was employed, the flap having been outlined with nitrate of silver after the scalp had been shaved the day before operation. The bony flap, measuring about 4 x 6 cm., was cut out with a chisel, and, as Kocher recommends, a crucial incision was made in the dura. The principal cause of epilepsy, according to Kocher, is the increase in intracranial pressure. The authors' cases only serve to establish their theory. On the principle that improvement would follow the removal of pressure, in two cases a greater part of the bony flap was removed. Kocher has found in following up his cases that in those which have recovered the defect in the bone had not been repaired, while in those that had not remained free from recurrence the bony opening had entirely or in large part ossified, or was closed by strong cicatricial tissue. As to the method of localizing the cortical centre, failures have been reported by those who have used a bipolar electrode, but if a single electrode is used the results will be satisfactory. Whether or not the excised centre was situated in the precentral convolution, where, according to the investigations of Sherrington and Grünbaum, the motor centres are situated, the author was unable to determine. There need be no fear that excision of the centres will cause a permanent paralysis; sooner or later function will for the most part be restored. In the author's case it returned exceptionally quick. Within twenty-four hours almost all the paralysis had disappeared. The author has collected from the literature some 84 cases. Of these, 29 per cent. have remained well for a year. Those which have been observed for less than a year, but at this time are free from attacks, number 20, and as improved there were 6; 5 died, and 28 were unimproved. Of traumatic Jacksonian epilepsy there were 35 cases; of these, 40 per cent. recovered. Of the non-traumatic cases of Jacksonian epilepsy there were 35 cases, of which 22 per cent. recovered.

The Horsley method of excising the cortical centre was practised in 14 cases, with 5, or 35 per cent., recoveries. The cases of recovery were observed from three to twelve years. In 11 instances was the centre localized by electric stimulation. The author is of the opinion that traumatic cases of Jacksonian epilepsy are those best suited for operative intervention, and the recommendation of the value of the Horsley method of treatment should be postponed until further observations have been made.

ŒDEMATOUS ENCEPHALITIS IN EPILEPTICS. Carr[1] calls attention to certain conditions of the brain which he found in operating for cranial epilepsy and allied affections. The principal lesion was an œdematous encephalitis, the gross and microscopic appearances of which, as they were seen in his cases, being described in some detail. This condition will be found, he believes, in a considerable number of epileptics, at least in the earlier stages of the disease, and when found should be treated by introducing a grooved director into the brain substance in several places, draining the serum off until the brain assumes a normal appearance. A small drainage tube is introduced beneath the dura and left in place as long as there is a copious discharge of serum. Carr frankly states that it is impossible to say whether his cases were benefited by the operation or not, but it is reasonable to assume that the draining away of a large quantity of serum, by relieving pressure and perhap scarrying off toxic substances, may be responsible for the relief which follows. In each of his cases the improvement was marked and immediate, though in one it was only temporary. I take this opportunity to call to the attention of surgeons the importance of making careful observations of the gross conditions which are seen in operations upon the brain. Surgeons, as a rule, are wont to pay too much attention to the technique of the operation and too little if any to the lesions that present themselves at the operation. At all events, the reports of operative procedures contain in the majority of cases altogether too brief descriptions of the appearance of the tissues in the field of operation. The articles by Munro and Carr are marked exceptions to the rule in this respect. In cases of epilepsy, concerning the pathology of which there is so much speculation, it is of the utmost importance that no opportunity should be lost to contribute to our knowledge by examining with the utmost care and recording in every detail the conditions found at operation.

EXCISION OF THE CERVICAL SYMPATHETIC for the relief of epilepsy has not many advocates. As Da Costa has well said, " the surgeon assumes an imaginary cause for the disease and combats this with a theoretical operation." Still, from time to time we see reports of the results of such operations as in the article by Hopkins,[1] who presents a preliminary report of five cases. In one there was a period of relief covering two years; in another six months; in a third there were three attacks in two years; in a fourth there was some amelioration for one year, and in the fifth the patient has been free from attacks for one year. No reports of the results of operations for epilepsy should be reported until at least three years have elapsed. The statistician must disregard preliminary reports if his tables are to be of any value. As a striking example of the tendency of how misleading statistics may be, a case of Engelhardt's[2] may be cited in which the patient was reported as cured five years after the operation. After an interval of rare seizures for three years and nearly two years of complete freedom from them, the attacks recurred, and in less than two years the patient was driven to suicide by their severity and frequency.

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[1] International Journal of Surgery, June, 1904.

TECHNIQUE OF CEREBRAL OPERATIONS.

Prevention of Adhesions. Those who have had opportunities to explore the field of a previous operation have seen the adhesions which have formed between the dura and brain as a result of the traumatism inflicted by the operative manipulations. The harmful influence of these in the production of postoperative epilepsy is such that one hesitates and sometimes even feels like refraining from advising operative intervention in cases of epilepsy, which are believed to be due to post-traumatic adhesions. Every surgeon has performed an exploratory craniotomy in Jacksonian epilepsy only to find a very limited area of adhesion between dura and brain, and has hoped that with the separation of these adhesions the exciting cause of the epileptic seizures would be removed. But in the course of a few weeks the convulsions returned with their former or often with increased vigor and frequency. A second operation is performed, and the last state is found to be worse than the first. Surgeons have striven by experimentation upon the lower animals and in their clinical work to find some means of preventing the formation of adhesions after operations upon serous membranes, whether it be dura or the peritoneum. Harris[3] discusses the various measures which have been adopted with this end in view. Chipault and Keen have removed the dura entirely; Beach, Estes, Weir, and others have introduced gold-foil; Abbe has tried rubber tissue, and Freeman has recommended the use of the lining membrane of an egg in place of inorganic substances. Whether the material should be an organic or inorganic substance has not yet been determined. There have been cases where such varied substances as rubber, silver, and gold-foil have remained *in situ* for a number of months with apparently beneficial results. Harris believes the thin foils are the best, and of these prefers silver. It is thin, soft, and smooth; conforms to all the irregularities of the surface on which it is laid. It is not only tolerated very kindly by the tissues, but exerts a beneficial influence on granulating surfaces. The foil may be placed directly in contact with the brain tissue, between the pia and dura, or wherever it may be necessary to accomplish the purpose desired. Harris reports a case in which silver-foil was introduced and the patient remained free from convulsions up to the present time—a year and ten months since the operation. It is important, he says, not only to control hemorrhage thoroughly and thus to prevent the formation and organization of clots, but to spread the foil some distance beyond the area involved in adhesions. From my experience in these matters I am disposed to believe that a non-absorbable material will not meet the indications. It stands to reason that a foreign body, no matter what the material, will be a source of irritation, and will excite the formation of granulation tissue, which will envelop the foreign matter and eventually become organized. Thus, a more or less extensive area of dura adhesions will be formed around the foreign body. I have found it necessary to reopen the wound and remove pieces of silver-foil which had been inserted to prevent adhesions because the epileptic seizures recurred soon after the primary operation with greater frequency and violence. In one case I found many new adhesions and considerable thickening of the dura mater, which could be attributed only to the presence of a constant source of irritation. I, therefore, prefer to use a material such as Cargile's membrane, which, after a reasonable time, will be absorbed.

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[1] New York Medical Journal, March 5, 1904.

[2] Deutsche med. Wochenschrift, Bd. xxx., No. 3.

[3] Journal of the American Medical Association, March 19, 1904.

Trephining under Local Anæsthesia. Heidenhain[1] found it feasible to perform a number of operations upon the head under local anæsthesia. He uses a $\frac{1}{2}$ per cent. cocaine solution, to which is added one or two drops of a $\frac{1}{10}$ per cent. solution of adrenalin. If the solution is injected beneath the scalp, down to the skull, in the course of half an hour not only the scalp but the underlying bone and it seems the dura, too, will be completely anæsthetic. He believes that in the $\frac{1}{2}$ per cent. solution 20 cg. of cocaine can be used for local anæsthesia without any danger of poisoning, providing certain precautions are observed. The patient should not come to the operation starved, and should during and after the operation maintain a horizontal position; during the operation he should be given coffee, with a few drops of alcohol, and after the operation a cup of thick soup. He should not be allowed to sit or stand sooner than one hour after the operation. Observing these rules, a ½ per cent. solution of cocaine can be used without apprehension of any untoward results.

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[1] Zentralblatt für Chirurgie, 1904, No. 9.

Of greatest importance are his attempts to remove tumors of the brain under local anæsthesia. If the operation is to be done under local anæsthesia it must be divided into two stages: at the first stage the osteoplastic flap is reflected with the patient in the horizontal position. The second stage is carried out with the patient in the sitting posture —a posture which would not be admissible until the effects of the cocaine had worn off.

Method of Closing Defect After an Osteoplasty. In a case of depressed fracture of the parietal bone in which both the internal and external tables were splintered in a stellate fracture Kayser[1] describes what he considers a novel method of closing the resulting defect in the skull. The portions of the internal table which were removed are replaced at right angles to their former direction so that the ends of the fragments are firmly fixed in the diploë. The fragments of the internal table, in cases of fracture, are, the author says, especially suitable for closure of a defect in the skull, because they are large, because they can easily be fitted to the defect by simple rotation, and because by reason of their smooth under surface they are not apt to form adhesions with the brain or meninges. An especial advantage of the method is that it allows immediate closure, even when extensive destruction of the membranes or of the brain substance itself is present. Sufficient space is allowed beside the fragments for drainage. The author's case demonstrated clearly the value of the method, inasmuch as there occurred immediate "healing in" of the fragments and ultimately a perfect result.

Topography of the Skull. Bert and Vignard[2] has given Krönlein's *craniometer* a thorough trial at Lyons and believes it to be more exact than any of the other craniometric methods. In twenty-five trials on the cadaver the fissures were exactly located in fourteen, and in eight there was a slight variation from the exact location, but never to a greater distance than the diameter of the trephine. It is a simple, easy, and inexpensive method of determining the location of the various centres in the region of Rolando and Sylvius.

Hæmostasis in Craniotomies. In the performance of craniotomies or craniectomies, when the incision is a very long one, a very considerable quantity of blood may be lost unless certain preventive measures be adopted. The position of the patient is important; with the head and shoulders well elevated hemorrhage is decidedly less free. I have been in the habit of making the incision in sections of one or two inches at a time, stopping to check all bleeding from one section before proceeding. This is the simplest and at the same time a perfectly satisfactory plan. Cushing[1] had made some inflatable or pneumatic tourniquets, which could encircle the head or limb and take the place of the old elastic tourniquet. The possibility of paralysis, the amount of pain caused by pressure, the difficulty of properly estimating the necessary degree of compression, the awkwardness and difficulties of observing the best technique during the application, removal, and especially the reapplication. These are some of the disadvantages of the ordinary Esmarch tourniquet to overcome which Cushing recommends his inflatable appliances. These tourniquets may be used to advantage also in the extremities, where the constriction may be relieved partially or entirely by allowing the air to escape; if for any reason it is desirable to cut off the blood supply, the tourniquet may be reinflated.

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[1] Deutsche Zeitschrift für Chirurgie, October, 1903.

[2] Revue de chirurgie, vol. xxiv., No. 4.

Heidenhain[2] recommends the adoption of a plan whereby bleeding from the flap can be reduced to a minimum. Before the incision is made sutures are introduced on either side of the proposed line of incision in such a way that when drawn tight they constrict the bloodvessels in the scalp. These sutures are not removed at the end of the operation, but are allowed to remain until the sutures in the wound are removed. He has never found that necrosis of the tissues followed this procedure.

The prophylactic method of hæmostasis suggested by Heidenhain is further endorsed by Hacker.[3] The latter believes that it should be used in every case in which it is necessary to reflect a flap, except, perhaps, those in which the basis of the flap includes the main vessels. Under such circumstances none but the smaller branches would be cut. Von Hacker's one objection to this method is the possibility of stitch abscesses at the points at which the percutaneous ligatures are introduced.

THE JAWS.

Cystadenomata of the Jaws. Pincus[4] reports two cases of central cystadenomata of the jaw observed in von Bergmann's clinic, and, together with a review of the reported cases, outlines the clinical history of these tumors. They occur most frequently in middle age, from the twentieth to fortieth years, though cases have been reported at the extremes of life. In the previous history the patients frequently state that they have suffered from some disease of the teeth, an alveolar periostitis or carious teeth which have been extracted. In some cases periosteal cysts may develop from these inflammatory foci; in others the adenocystoma may be stimulated into development. Females are affected nearly twice as frequently as males, and Pincus could find but one case in the literature (Albarran's) in which the upper jaw was involved. The growth of the cyst is exceedingly slow, usually without pain, and increasing from within gradually thins the overlying shell of bone to such an extent that the familiar sign of "parchment-like crackling" is elicited. The skin overlying the growth is not involved and is freely movable over the bone. Fluctuation is commonly observed, and by giving proof of the cystic nature of the growth has led to the hope that aspiration of the fluid might furnish a method whereby the origin of the cyst could be determined. But unfortunately nothing characteristic has been noted in the contents of the cyst; it is of a yellow-brown or reddish color, containing cholesterin crystals and frequently a chalky deposit, giving the reaction for calcium carbonate. The lymph nodes, especially those in the submaxillary region, are occasionally enlarged, but only when ulceration of the cyst into the mouth cavity has occurred; the histological examination of such nodes show an inflammatory hyperplasia only. The diagnosis of these cysts must be made from carcinoma, sarcoma, odontoma, and dental cysts. Carcinoma originating in the epithelium about the jaw occurs much more frequently in the upper jaw, affects patients of a more advanced age, is painful, involves the regionary lymph glands, and is of more rapid growth. Sarcoma is particularly difficult to diagnose from the benign adenocystoma, particularly in the early stage of the myelogenous form. The age, the absence of glandular involvement, the occasional cystic nature of the mucoid or necrotic degeneration of the tumor cells resemble adenocystoma, but the growth is much more rapid, pain is present, and the tumor breaks through the bony shell in a short time. Odontomata are distinguished by the period of development. A cyst occurring after the complete development of the teeth is never an odontoma. Dental cysts resemble the adenocystoma in that both may contain a serous or serosanguinolent fluid, calcium fragments, or rudimentary teeth, and a fully developed tooth. The greater size which the adenocystoma attains, its extreme rarity in the upper jaw, and the microscopic examination of the cyst wall are the points of interest in the differential diagnosis. Histologically the cysts are believed to develop from rudiments of the enamel organ, to be epithelial in nature, and relatively benign. As incision and curettement of the cystic growth are frequently followed by recurrence, the tumor should be thoroughly removed by the hammer and chisel, even if it is necessary to partially resect the jaw.

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[1] Medical News, March 26, 1904.

[2] Zentralblatt für Chirurgie, 1904, No. 9.

[3] Ibid., No. 29.

[4] Archiv für klin. Chirurgie, Bd. lxxii., Heft 4, S. 995.

Dentigerous Cysts. As a rule but slight mention is made in the textbooks of dentigerous cysts because the diagnosis is comparatively easy, the treatment not difficult, and the condition itself not a serious one. There have been some very interesting contributions in literature from time to time, and these have dealt chiefly with the pathogenesis, as this is decidedly the most interesting phase of the subject, and the one which has excited the most discussion. Cumston,[1] in reviewing the subject, says that while Magital unquestionably did much to enlighten us, it is to Malassez that we are especially indebted, because he discovered that in the maxilla of embryos, in different stages of development, during the formation of the teeth there takes place, besides the physiological proliferation of the epithelium for the formation of the dental follicle from the embryonal enamel, other proliferative processes arising from both the organon adamantinæ and from the mucous membrane. These epithelial masses are in structure exactly like the enamel organ and persist in the lower jaw during adult life. It is from these masses that the so-called neogenous cysts of Magital as well as all tumors of the epithelial origin, such as the multilocular cystomata and cystadenomata, take their origin. Witzel's observations were interesting in this connection because he found these cysts in extracted teeth in the earliest stages of their development, long before they had reached the size at which they would attract the attention of the surgeon. They varied in size from the head of a pin to a pea; their walls were composed of an outer layer of connective tissue, an inner layer of epithelium, and between the two a layer of tissue abounding in bloodvessels and leukocytes. The histological structure of the larger cysts is very similar, save that the epithelial cells are flattened instead of being cubical. This variation is attributed to a tendency of epithelial cells to adapt themselves to the amount of pressure that is brought to bear on them. Cumston then alludes to three cases which he had seen. One about the size of a walnut, developed in the upper jaw just under the left nostril. The left nasolabial fold was completely obliterated and the nostril was pushed upward. Another was found in a boy, in the anterior aspect of the superior maxillary bone; it was of three years' duration and was as large as a small hen's egg. A third was that of a man, thirty-seven years of age, who for about eighteen months had noticed a tumor in the neighborhood of the wisdom tooth. They were all treated by incision, removal of the lining membrane, and drainage.

These cysts naturally grow in the direction of least resistance, and once the root is firmly lodged in the alveolar process by its periosteum the bone, being less resistant, gives way to the pressure. The absence of periosteum from the roots and apices of the teeth, which are sometimes found projecting into the cavity of the cyst, may be attributed to the effect of pressure exerted by the growing cyst upon the vessels and nerves supplying the tooth and periosteum of the root. As a class these cysts are known as periodontal or progenous (Magital) cysts in contradistinction to the periginous cysts which develop around a foreign body. The latter, acting as a source of irritation to the epithelial streaks of Brunn, cause an active proliferation of the epithelium, and this leads to cyst formation. It is easily conceivable that a tooth which did not make its exit from the jaw might well play the role of a foreign body and thus become the exciting cause. The retention of developed teeth does not necessarily lead to the formation of a cyst as in the case reported by Hildebrand, in which two hundred perfectly developed teeth were removed from the upper and lower jaws without any evidence of cystic formation.

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[1] Medical Record, May 7, 1904.

The diagnosis of dentigerous cysts when they have reached a certain size is attended with little difficulty. One finds a unilateral swelling of slow formation, gradually expanding the bone until it becomes so thin as to crackle on pressure or finally disappear by pressure atrophy. In some cases the cysts may rupture and evacuate their contents spontaneously. An exploratory puncture will give issue to a serous fluid unless the cyst has become infected from the buccal cavity or from the remains of decayed teeth. In the earliest stages it may be difficult to distinguish cysts from any circumscribed tumor of the jaw. Cystadenomata grow almost exclusively in the lower jaws. If a cyst should burst into the antrum a primary empyema of this cavity will arise, and vice versa. An infected cyst of the superior maxillary opening on the outside might easily simulate an empyema of the antrum if the cystic sac protrude into the cavity and completely fill it. Suppurating dentigerous cysts may resemble an alveolar abscess, but if the topography of the parts be remembered an erroneous diagnosis can hardly be made. The treatment is simple. Operation should be immediately undertaken and every vestige of the lining membrane should be removed. To accomplish this the cavity should be exposed by a large opening and the epithelial membrane removed with curette, scissors, or cautery. If any tooth or root is found protruding into the cavity, it should be removed. In the larger cysts of the lower jaw it may be necessary to reach the tumor through a cutaneous incision, but in most cases they may be reached through the buccal cavity.

Fractures of the Lower Jaw. A very efficacious and at the same time original method of securing fixation of the fragments in fractures of the lower jaw has been suggested by Mann.[1] It consists essentially in ligation of the teeth of the lower to those of the upper jaw, and is particularly adaptable to double fractures. At first the fractured ends of the jaw should be drawn together by a ligature of silk or cotton thread (not silver wire), by a figure of 8 turn passed around four teeth, two on either side of the fracture. If the line of fracture does not lie between teeth available for this purpose, this method will be impracticable. Teeth should now be selected for the special ligatures. At two convenient places two suitable teeth should be selected on the upper jaw which are fairly well apposed to two suitable teeth on the lower jaw. If the fracture is fairly well forward, one pair of teeth should be taken on one side of the fracture and one on the other side. If the fracture is farther back both pairs may be taken on the same side of the fracture. The ligature material may be carried backward between two of the teeth selected, well toward the jaw line, and often through some of the soft tissues, back around one of the teeth, in again between the teeth and back about the other one. This should be done so that the loose end between the teeth lies deeper than the main portion of the ligature, and so that the ends will tie above it, and pull it down when the ends are pulled down. This will serve to bind the suture tighter to the teeth when the ends are under tension. In a similar way a ligature should be tied about each two teeth selected. This will give two places with two loose ends above and two below. If there is no tendency to lateral displacement of the fractured jaw, the two ends above may be tied to the two ends below, separately or together, but so as to hold the lower jaw well up against the upper jaw. If there is a tendency toward lateral displacement, one may be left untied above and one end on the opposite side below. These ends may now be drawn together diagonally across the front of the teeth and tied so as to correct the displacement. The ends from right

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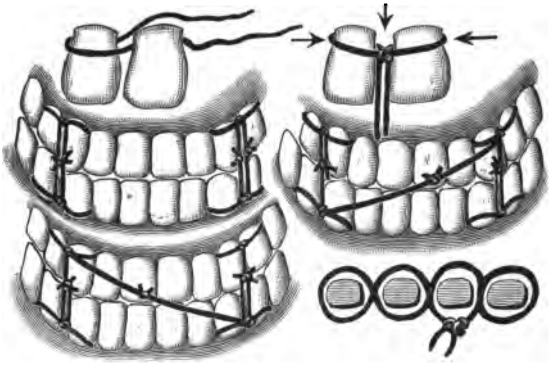
[1] Northwestern Lancet, vol. xxiv., No. 2.

FIG. 1.



Fracture of the lower jaw.

to left are used if the displacement is toward the left, and vice versa. The modified head bandage is now applied to remind the patient that he is not to jerk his mouth open against the ligatures. If the ligatures are placed with care they will usually stay in place for a long time. The above method of treatment is of peculiar advantage in some cases usually difficult to treat. In one fracture just back of the last molar it seemed impossible to gain fixation by the usual means, but tying the teeth of the lower jaw to the teeth of the upper jaw easily drew the jaw forward into place and held it there. The periosteum and the anterior attachment of the masseter muscle held the fragments together. In a similar way a fracture through the ramus with some angular deformity may be drawn into place and fixed; or a jaw swung over toward a fractured condyloid process may be drawn forward into place and held there. There is no difficulty about the feeding. A patient can take liquids, semisolids, soft-boiled eggs, and the like, by suction around behind the back teeth; and he can keep his mouth clean and comfortable by rinsing it with a suitable mouth wash.

Knapp[1] devised a rather ingenious method of making traction upward and forward to counteract the effect of the muscles attached to the hyoid bone. A strip of tin turned up at one end to form a gutter was secured to the head from the forehead to the occiput with a plaster-of-Paris bandage in such a way that the gutter projected beyond the bandage just above the eyes. Strips of adhesive plaster passed from the under surface of the chin to the gutter of the splint gave the desired traction upward and forward.

In cases of fractures in the front of the mandible, when the teeth are sound and steady, some surgeons use Hammond's splint. This consists of a stout wire which is bent to pass around the arch of the teeth inside and outside. There are certain objections to this splint, chief among which is the difficulty with which the wire is bent to its proper shape and the time consumed in making it. Crombie[2] suggests certain modifications of this dressing which he thinks obviates these difficulties. He makes a splint of stout, flattened wire of dental alloy fitted around the arch of the teeth in front and another similar wire fitted around the teeth behind. Collars of dental alloy plate are then fitted three-quarters around the back and sides of the second bicuspids or other suitable teeth on either side, and the ends of the wire soldered on to these collars with gold solder. The fracture having been reduced, the splint is placed in position and held in place by ligatures of binding wire passed between the nicks of the teeth at suitable points.

Sarcoma Treated by Radium. The patient had a large giant-celled sarcoma of the lower jaw, which surgically treated called for resection of the jaw, with hopeless mutilation and inevitable recurrence. Abbe[1] tried the effect of radium and found that not only was the development of the growth arrested, but that there was a marked shrinkage. The final report of the case has not been made.

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[1] Medical News, February 27, 1904.
[2] British Medical Journal, July 9, 1904.

Fibrosarcoma of the Antrum. Although the tumor was of two years' duration and had filled the entire cavity of the antrum, recovery ensued after its removal. Ingraldi,[2] who reports the case, says that the patient first complained of obstruction to the nose and had repeated copious hemorrhages. Some polypoid masses had already been removed from the nose before the condition had been recognized.

Actinomycosis. In the case reported by Harsha[3] the patient had a swelling of the size of a hen's egg at the angle of the jaw on the right side. The swelling, which was of four weeks' duration, increased in size, was quite hard at the edges, and seemed fluctuating. The tissue at the operation was found to be broken down and it presented the characteristic appearance of actinomycosis surrounded by a very dense, hard tissue. The mass was removed, but the wound did not heal until the Roentgen rays were applied. The characteristic ray fungus was found in the purulent discharge.

THE TONGUE.

Sarcoma of the Tongue. About three dozen cases of sarcoma of the tongue are on record. Keenan,[4] in an analysis of these, found that all belonged to the group of round-celled sarcomata, that they occurred not in early life, but in middle age, mostly between the ages of forty and fifty. Extensive metastases in the neighborhood were rather the exception than the rule, and local recurrence, though it may happen, is not common. Clinically they are to de distinguished from cancerous growths by the fact that the epithelium usually remains intact and only ulcerates after a long period. While a differential diagnosis between sarcoma and gumma may be difficult, with the aid of the microscope reliance may be placed upon the therapeutic test. In a case which came under Keenan's observation the growth was excised, but the patient died as a result of metastasis in the abdominal organs.

Lymphatic Invasion in Malignant Disease of Tongue. Lockwood[5] calls attention to the fact that the lymphatic glands in malignant disease of the tongue are not involved, as one would expect, according to their anatomical distribution. It is not always the glands nearest the lesion that are first involved, nor always the glands in the same side as that of the lesion. The lymphatic vessels at the tip of the frænum of the tongue empty into a gland under the mental process of the jaw, and this region should always be explored in operations for lingual epithelioma. Another gland which is frequently involved is situated on the hyoglossus, close to the edge of the mylohyoid. It is not always possible to feel the gland, even if enlarged, from the outside; one should examine by bimanual palpation, placing one finger inside the mouth and one outside in the submaxillary triangle. Attention is directed to a lymphatic arising from the tongue, which, passing down over the hyoid bone and thyroid cartilage, makes a loop and then enters a gland situated on the carotid artery, where it is covered by the omohyoid. The glands in the deep side of the submaxillary gland, the chain of glands along the carotid sheath from the base of the skull to the root of the neck, and the retropharyngeal glands, as well as the glands in the opposite side of the neck, should be included in the list of lymphatic glands, which are in direct communication with the lymphatics of the tongue.

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[1] Medical Record, June 4, 1904.

[2] Gazetta degli Ospedali cliniche, May 22, 1904.

[3] Annals of Surgery, March, 1904.

[4] Annals of Surgery, June, 1904.

[5] Clinical Journal, June 8, 1904.

Epithelioma in Women. There can be no doubt that epithelioma of the tongue in women is decidedly uncommon, but the frequency with which it occurs varies apparently according to the sources from which the cases are derived. According to different authorities the percentage of cases of epithelioma in women as compared with men varies from 3.4 per cent. to 43 per cent. Keyser[1] publishes the notes of 10 cases of patients who had come under his own observation either in the St. George Hospital or in the Cancer Hospital. In neither the appearance, situation, course, diagnosis, prognosis, nor treatment does the lesion in women appear to differ from that in men.

THE FACE.

Paraffin Prosthesis in Bilateral Facial Atrophy. Unless some means are adopted to correct the deformity the prognosis in progressive facial hemiatrophy, so called, is absolutely unfavorable. The atrophy progresses usually within a year or two of its beginning to a certain point, and then the process ends with no danger to life and often without discomfort. The condition is unaffected by massage, electricity, or dieting. The first attempt to correct the deformity was made by Luxemburger in 1901; he treated 2 cases by subcutaneous injection of vaselin. Since that time Eckstein, Gersuny, and others have used paraffin for the same purpose. Burley[2] records his experience in a single case in which the results were far beyond expectation. The atrophy followed an attack of pneumonia when the patient was eleven years old, and twelve years later the treatment was undertaken. In all, nine injections of from 1½ to 2 c.c. of paraffin with a melting point of 109.5° were given at an interval of a week. By this time the result was so satisfactory that no further treatment is likely to be necessary. In place of the atrophied subcutaneous tissue there is an inert, light, but firm substance. The natural movements of the face are surprisingly little impaired, and the patient had ceased to complain of the feeling of stiffness in her cheeks.

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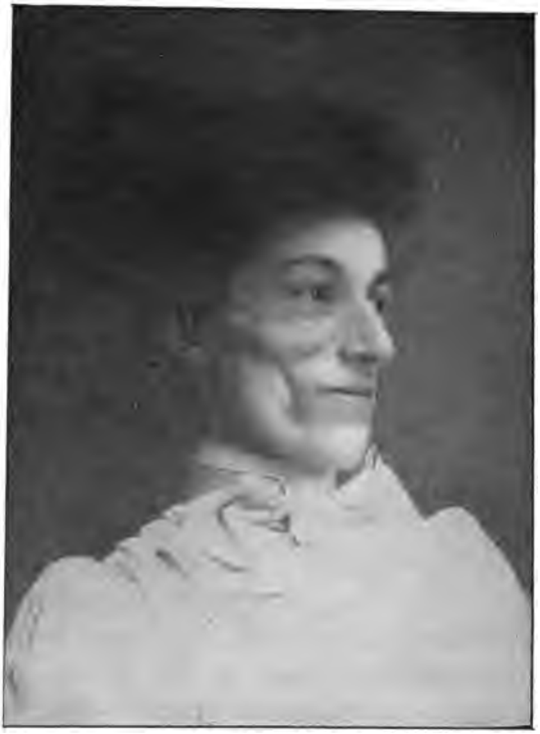
[1] Lancet, September 17, 1904

[2] Boston Medical and Surgical Journal, April 14, 1904.

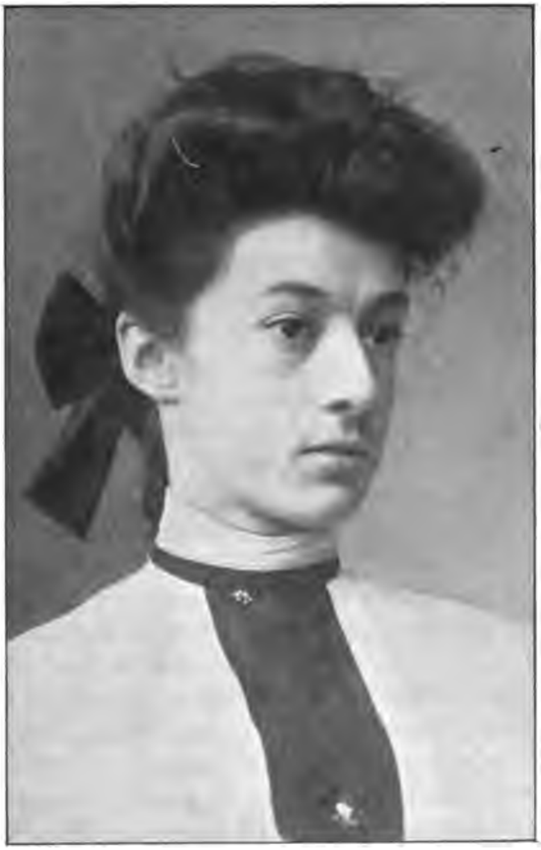
FIG. 2.



Facial atrophy before paraffin injection. (Burley's case.)

The Treatment of Nævi by the X-rays. The various methods hitherto employed in the treatment of nævus are not perfectly satisfactory from a cosmetic point of view. The so-called Wyeth method of injecting boiling water into the vascular spaces has yielded the best results in my own hands. If precautions are taken not to inject too much at one time the results are well-nigh perfect. The *x*-rays have been used in a number of instances, and in some cases with satisfactory results. But in order to cause obliteration of these telangiectatic lesions one must produce a dermatitis; the skin peels off, leaving a raw surface, which must heal by proliferation of epithelium from the edge of the defect. There is danger, of course, in producing an x-ray burn involving more than the superficial layers of the skin. In such cases the cicatrix resulting from the repair of the defect may of itself cause considerable disfigurement. Levack[1] treated 3 cases with seemingly good results. The resulting scar differed but little from normal skin, was generally of the same color, and quite as soft and pliable as its surroundings. The deeper tumors are naturally more difficult to eradicate than the superficial ones, but with care and persistence, he believes, even they can be made to ultimately yield and in most instances to disappear.

FIG. 3.



After the injection of paraffin.

Rodent Ulcer. In the application of the x-rays to rodent ulcers Fraser[2] thinks the results will be better by exposing the parts considerably longer in the first instance than the orthodox five minutes—perhaps five to six times as long. His practice now is to give an exposure in two consecutive

[1] Scottish Medical and Surgical Journal, July, 1904.

[2] Ibid., May, 1904.

days of, say, twenty minutes, then intermit for two days, and thereafter be guided by circumstances—particularly the reaction. This plan was adopted in a very extensive ulceration with most gratifying results.

Exostosis of Frontal Sinuses. The diagnosis of exostosis within the frontal sinuses may be attended with considerable difficulty, especially in the earlier stages, and may be at times even impossible, owing to the entire absence of objective signs. Severe frontal headache with a slowly increasing tumor appearing over the frontal bone or projecting from beneath the eyebrows are the earliest signs. Invasion of the orbit with displacement of the eyeball, disturbance of its motion, and double vision may send the patient to the ophthalmologist at first for treatment. Growth of the osteoma into the skull cavity may give rise to brain-pressure symptoms. Perthes[1] urges the use of the Roentgen ray as a valuable adjunct in the earlier recognition of these tumors. In a case reported the location and extent of the growth were accurately outlined and operation revealed the correctness of the findings, an osteoma weighing 25 grm. being removed. Perthes particularly urges the systematic enucleation of the encapsulated osteoma through a broad osteoplastic flap of the frontal bone in preference to the piecemeal chiselling through the roof of the orbit. Greater confidence in the more radical operation is gained by the knowledge confided by the use of the *x*-ray in accurately defining the tumor.

Nasopharyngeal Fibromata originating from the base of the skull extend into the pterygopalatine fossa and nasal cavities, and in a remarkably short space of time attain large proportions. Their removal requires an operation which becomes formidable through the efforts to expose the pedicle of the polyp and to gain sufficient room in which to work. Hertle[2] reports a case where the removal of a fibroma of the nasopharyngeal cavity was accomplished by the operation suggested by Kocher. In commenting upon the case Hertle remarks that the defect in the palate following the temporary separation of the severed superior maxilla on either side must be closed by a subsequent uranoplasty. As these tumors are frequently excessively vascular, the bleeding may be very profuse, not only depleting the patient, but interfering with respiration by filling the trachea. Firm pressure by gauze packing and the use of the actual cautery sufficed to control the hemorrhage in the case reported. Curiously enough Hertle condemns the expedient of temporary ligature of the external carotid, the risk of thrombus formation being considered too great to permit of its use. He finally suggests that the operation affords a means of ready access, not only to malignant growths of the nasopharyngeal space, but to tumors of the pituitary body.

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[1] Archiv für klin. Chirurgie, Bd. lxxii., Heft 4, S. 1022.

[2] Ibid., Bd. lxxiii., Heft 1, S. 75.

Rhinoplasty. Habs[1] has devised a rather novel plastic operation for the restoration of the nose. His technique differed from others, in that the flaps contained a strip of bone covered with normal periosteum. This was essential, since his patient had lost the entire nose, including its bony support. After having fashioned the skin flap on the ulnar side of the forearm and dissected it back, a similar-shaped flap of bone, together with the periosteum, was chiselled off the underlying ulna. This was reflected in such a way that the raw surface of the bone and that of the skin flap were brought into apposition and fixed there, while the segment of bone itself remained still in connection, through a broad bridge of periosteum, with the underlying bone. At the second sitting the periosteal ridge was covered with skin, so that the entire flap was now contained within a cutaneous envelope. Several months later, after freshening the nasal defect, the flap was sutured in place, while immobility of the arm was secured by a plaster-of-Paris bandage. After three weeks the base of the flap on the arm was divided. The cosmetic effects were all that could be desired. Equally good results may be obtained in a less complicated way by utilizing one of the patient's fingers. The author has resorted to this method with satisfactory results. An incision is made along the palmar aspect of the fingers and flaps reflected on either side. The raw surfaces are then covered with skin grafts, and, when healing is complete, the edges of the nasal defect are freshened and the edges of the finger flaps are united to them with fine silk or catgut sutures. The arm is secured in place with a plaster bandage and retained until a sufficiently free circulation has been established through the edges of the wound to provide for nutrition of the finger when it is cut off from its original blood supply. The finger is now amputated at the metacarpal-phalangeal joint, and the proximal phalanx flexed so that the tip of the nose is represented by the head of the proximal phalanx, and the base of the latter is sutured to the lip so as to form the column. The success of the operation will depend, of course, upon the establishment of a collateral circulation sufficient to ensure the preservation of the amputated finger.

Atresia of the Nasal Passages. Success can be obtained in plastic operations for the removal of nasal obstructions, no matter what their origin, only by covering in the raw surfaces of the incision with skin or mucous membrane. If this precaution is not taken, the opposing raw surfaces will grow together or the contraction attending their repair will exaggerate rather than improve the condition for which the operation was performed. The following diagrams illustrate Roe's[2] method of treating atresia of the upper and lower portions of the vestibule (Figs. 4 to 7).

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[1] Münchener med. Wochenschrift, 1904, No. 10.

[2] New York and Philadelphia Medical Journal, July 30, 1904.

The operation for the removal of synechiæ is performed in a similar manner by utilizing the mucous membrane of the band for covering the denuded surface on one side of the nostril, where the band has been cut away. Fig. 8 represents synechiæ between the middle turbinated bodies

Fig. 4.

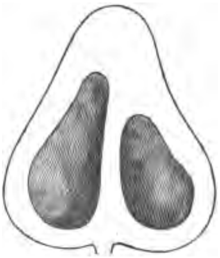

Fig. 5.

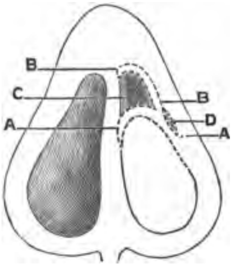

Fig. 6.

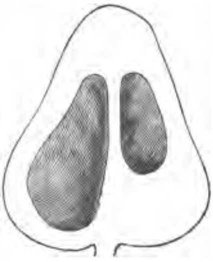

Fig. 7.

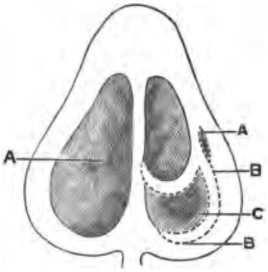

Fig. 8.

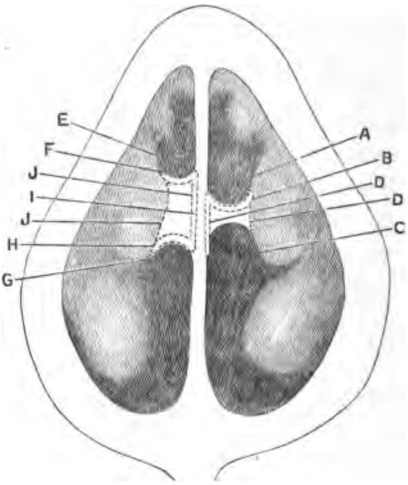

Fig. 4.—Contracted condition of upper portion of opening and vestibule in atresia of anterior nasal passage.

Fig. 5.—Line of incision for correcting this condition. A A. Method of making flap of skin for apex after removal of redundant tissue. B B. Incision for removal of redundant tissue; also shows flap turned up into apex of opening. C. Flap from portion of redundant skin turned back to cover denuded border.

Fig. 6.—Atresia occupying lower portion of vestibule.

Fig. 7.—Method of operation for correcting the condition shown in Fig. 6. A A. Incision for flap to fill in lower border after removal of redundant tissue. B B. Flap in place. C. Portion of skin turned inward to cover denuded wall.

Fig. 8.—Synechiæ between middle turbinated bodies and septum, showing method of making flaps to cover denuded surfaces on one side of the passages after the bands have been cut away.

and the septum and the method of making the flaps for covering the denuded surfaces on one side of the passages after the band has been cut away. On the right-hand side of the drawing is shown a condition in which but one flap only (preferably from the upper side of the band) is required for covering the denuded space on the septum. A B shows the line of incision for making the flap. A C shows the flap applied against the septum, where the band has been cut away at D D. On the left-hand side is represented a more extensive synechia, in which the flap from both the upper side, E F, and the lower side, G H, is required to cover the denuded surface on the septum. E G shows the two flaps placed against the septum and stitched together at I with fine horsehair sutures after the synechia has been cut away at J.

In those cases in which the band is very wide, it may be necessary to take flaps from both the upper and lower sides of the synechiæ in order to cover in the defect. Union of the flaps in all cases may be facilitated by lightly packing the nostril and by inserting a Simpson-Bernay intranasal tube. The sutures may readily be introduced by the small curved needles which Roe has devised for this and similar work. They have a double spiral curve, so as to permit the insertion of a suture at right angles to the shaft of the needle and in a very small space. When the synechiæ occupy the vault of the passage, the same plan of operation as suggested for restoring the skin to one side of the vault of the vestibule may be applied. In the removal of hypertrophied bodies and bones, a flap of mucous membrane sufficiently thick to preserve its vitality should be reflected. The obstruction is then removed, and the defect covered by the flap. In case of bony or cartilaginous spurs, the periosteum or perichondrium should be raised also. This method preserving the periosteum, as well as the mucous membrane, is of special service also in the operation for the so-called submucous resection of the septum.

Saddle Nose. The introduction of plates for the correction of this deformity frequently resulted in failure, and the method has been replaced almost entirely by paraffin injections. Wiener[1] was successful, however, with a celluloid plate in securing the desired result. He made a small incision in the median line in the under surface of the nose, and through this incision, with iridectomy scissors, he made a subcutaneous flap. A piece of celluloid of the proper dimensions was moulded into shape and introduced through the incision and pushed upward until it occupied the space corresponding to the subcutaneous flaps. There was a little swelling for a week or ten days, but the wound readily healed, and the flap preserved its vitality.

[1] Medical Record, April 10, 1904.

THE NECK.

Torticollis. The etiology of torticollis is a question which has given rise to considerable discussion and speculation. The investigator is confronted with a number of questions, not the least of which is the fact that the development of the process is an intrauterine one, and, therefore, not capable of direct observation. Kempf[1] reviews, in a critical way, the opinions of those who have given this subject their especial attention, and as a result of his investigations he has come to the following conclusions as to its etiology: The histological findings in the sternocleidomastoid muscle cannot be offered in proof of the inflammatory nature of the affection. Rather are they in favor of the anæmic theory, both on account of the exposed position of the muscle and the peculiar distribution of its vessels. The sternocleidomastoid muscle offers conditions which may be said to be favorable to the development of an anæmia. The vascular supply of the muscle is derived from vessels which enter the muscle only in its upper third. Only in exceptional instances does the middle or lower third receive separate branches; taking into consideration the position of the fœtus *in utero*, one can easily see how readily the circulation of the lower half of the muscle may interfere with it by pressure of the shoulder upon the neck. In many cases, no doubt, do trophoneurotic processes exaggerate the effect of this anæmia. The induration of the sternocleidomastoid muscle, from a pathological point of view, is comparable to an hemorrhagic infarct. The induration may disappear without resulting in any structural changes, but occasionally it leads to the familiar contractures. The author goes on to present an itemized report of 37 cases which have come under his observation in Kredel's clinic. The treatment consisted in the performance of the open operation, and in the persistence for a long time afterward of appropriate postoperative treatment. The results, in a general way, may be said to have been thoroughly satisfactory. In all the cases symmetry was restored. Active and passive motion to the right and left side was possible in 18 cases. In 3 cases the head could be turned as well toward one side as toward the other. The author prefers this operation to the method of Mikulicz, not only because the results are quite as satisfactory, but because the cosmetic effects are very much better.

Carotid or Intercarotid Body. Tumors of the carotid body have been observed more or less frequently of late, although they cannot by any means be said to be very common. It is more than probable, however, that in many instances heretofore the true nature of the condition has not been recognized, and, as a rule, they have probably been looked upon as tuberculous lymphomata or malignant glands. In 1888 Jonathan Hutchinson gave an account of some instances of a peculiar growth springing from the upper third of the anterior triangle of the neck, to which he gave the name "potato tumor." It is more than likely that many of these were endotheliomata of the carotid body. Of these growths he said: "It has no connection with the parotid or face, but grows under the sternomastoid. From beneath that muscle it pushes its way both behind and forward, and assumes the shape of a huge kidney potato. It can never at any stage be recognized as consisting of separate glands, and it seldom shows any tendency to implicate or cause enlargement of adjacent glands, but, having once begun, it grows rapidly as a continuous, very firm, nodular mass. From its form and its hard nodosities, I have been in the habit of calling it the submastoid potato tumor. Its growth is usually so rapid that it produces death within a year or eighteen months from its beginning. It brings about death by its growth, its pressure upon adjacent parts, and by the bleeding and discharges which attend its ulceration. So far as my knowledge extends, there is no tendency to the production of secondary tumors. I have seen at least eight examples of it. . . . . In several cases portions removed for microscopic examination have been pronounced 'round-celled sarcoma,' or 'lymphosarcoma.' I am not familiar with any growth of quite parallel clinical history in any other region. . . . It may be conjectured that it begins in the submastoid glands, but, if so, it is very remarkable that neither can its gland enlargement stage be recognized nor does it spread to the glands. Nor must it be forgotten that cystic tumors also are sometimes developed in this precise situation. On the supposition that it begins in lymph glands, it is further very difficult to account for the fact that it always forms under the upper third of the muscle; never lower down." Guilford[1] reported 3 cases of this condition, all occurring in middle-aged or old men, 1 of them affecting both sides of the neck, and associated with metastasis in the liver. Upon 2 of the cases he operated; in 1 he found it necessary to remove the common and internal carotid arteries, the internal jugular vein, the vagus and descendens noni nerves, and in another the carotid arteries and internal jugular veins. The first patient died on the seventh day after operation. The other survived the operation, and finally died from exhaustion five months later. In the mean time the growth had recurred and grew far more rapidly than it had done at first. In all 3 cases the growths were apparently of a high degree of malignancy, and sprung from one particular situation in the neck. Their position, their relation to the carotid arteries, and penetration of the carotid sheath at the point of bifurcation, all pointed to an origin from a structure situated in this neighborhood, and this structure is the carotid body. In respect to the malignancy of these tumors, there is some difference of opinion. Reclus, for example, is of the opinion that these growths are probably not malignant, and for this reason, as for others, advises surgeons to abstain from operations unless the tumor gives rise to some severe functional disturbances. Marchand and Kopfstein disagree with Reclus, and state definitely that the tumors in their cases were malignant. In the opinion as to operative interference, Reclus probably stands alone. Funke[1] records a case of a middle-aged man who presented himself with a tumor in the region of the angle of the jaw, of slow growth and about six years' duration. At the operation it was found firmly adherent to the carotid vessels, and in attempting to remove the growth it was necessary to remove them. The patient died not long after the operation, of cerebral anæmia. The author gives a brief *résumé* of our present knowledge as to the embryology and histology of the cartoid body, together with an outline of the symptoms and of the diagnosis. He submitted a table of some 15 cases, the majority of which will probably be found in the collection of Scudder and in that of Reclus and Chevassu.[2] From his own investigations, he is inclined to believe that the carotid body is not present as often as is generally maintained. In eight fœtuses examined, it was present only once. In one fœtus the cervical ganglion occupied the position of the carotid body, and it was only after careful microscopic examination that the nature of the structure was recognized.

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[1] Deutsche Zeitschrift für Chirurgie, Band lxxiii., Heft 4–6.

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[1] Practitioner, December, 1904.

Mixed Tumors of the Parotid Glands. The etiology and pathology of these tumors offer an attractive field for investigation. Wood[3] presents his views, which are based upon the results of clinical and pathological study of some fifty-nine specimens. They can be divided macroscopically into three great rough groups with characteristic morphology, and to a certain extent with a definite clinical course. First, the very fibrous tumors, with but very little similar structure and with very little mucous degeneration and no cartilage; secondly, the very hard tumors, containing large masses of cartilage and but little connective tissue or cellular parenchyma; and thirdly, the soft, very cellular growths, with transparent trabeculæ of mucous tissue, surrounding areas which are opaque and yellow, and on microscopic examination will be found to be dense cellular areas, the color being occasionally, though not always, due to fatty degeneration or necrosis of the cells. The first and second forms are likely to be benign in their clinical course, while the third is likely to recur locally or to run an exceedingly malignant course. A few of the tumors belong to the first group, about one-quarter to the second, while the majority belong to the third. The average duration of these tumors until they caused the patient to seek surgical aid was, in Wood's series, eight years and nine months. As to the clinical course, it may be said that some 25 per cent. undergo changes which express themselves in a clinical malignant course, while about 30 per cent. recur after operative removal. The record of Wood's series differed in that 45 per cent. recurred locally. In 4 cases internal metastasis was soon apparent, and the local condition was so serious that the patients either died of operative shock or the tumors became inoperable from the invasion of the bone and deep tissues of the neck. In 12 cases, or 33 per cent., there were local recurrences which were checked by operation. The malignancy of this growth can be judged to a certain extent by their slowness of growth and their physical characters. When the growth of these tumors suddenly becomes rapid, the clinical and microscopic evidence of malignancy are usually manifested. In attempting to explain the sudden change which takes place in benign growths and causes them to become malignant, Wood suggests that the presence of a dense fibrous capsule may prevent tumor cells from spreading through the tissues, and that when this capsule is removed by operation on a quiescent tumor and small portions of the tumor cells are left behind, a rapid recurrence is the rule and the new-growth may reach a bulk in a few weeks greater than that of the original tumor. Another feature which should be taken into consideration is the increased vascularity of the tissues in cases of recurrence. The comparative absence of bloodvessels in the primary tumors is noteworthy. A third factor which he believes to be worthy of consideration in the development of malignancy in these growths is the presence of abundant embryonic connective tissue. It seems likely, he says, that the embryonal connective tissue of the original growth undergoes a change which expresses itself in the formation of the rapidly growing sarcomatous tissue. As to the etiology of these growths he is inclined to agree with those who explain them on the assumption of an embryonic misplacement of the mesoblastic tissue. The structure of the parenchyma is so slightly characteristic in morphology that its epithelial nature in all cases can only be considered as probable; yet in about 25 per cent. of the tumors examined the presence of epithelium is undoubted, and the form and relationships of the cells of the parenchyma did not furnish sufficient data to justify these cells being regarded as of endothetial origin. The theory of early embryonic displacement of epiblastic tissue during the process of formation of the parotid and submaxillary glands and the branchial arches may account for many of the morphological peculiarities of the cells of these tumors, especially the lack of many typical features which are associated with them. The same condition may be seen in the epithelial cells of the congenital moles, in which the epithelium is with difficulty distinguished from connective-tissue cells owing to its close connection with the stroma of the tumors and its undifferentiated type. The mixed tumors of the salivary glands run a clinical course strikingly different from the sarcomata and carcinomata in that they are slow growing and generally benign, the original lymph nodes are not infected, and the recurrences are likely to remain local in a considerable proportion of the cases.

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[1] American Medicine, July 16, 1904.

[2] PROGRESSIVE MEDICINE, March, 1904, pp. 81–82.

[3] Annals of Surgery, January and February, 1904.

The tumor which Keen[1] removed was interesting because of its enormous proportions. The weight was estimated at about seven pounds. The pathological diagnosis was myxochondrolymphangioendothelioma. The slow and later the rapid growth of the tumor, its enormous size, the age of the patient (sixty-five), and the fact that it was possible to dissect it away from the important structures seemed to justify the report of such a case.

Secondary Fatal Parotitis. Following operations upon the pelvic viscera, as well as upon the abdominal organs, parotitis is not a very uncommon complication. In some instances it undergoes resolution without any active surgical measures, but more often an incision for drainage is required. The prognosis in most cases is good. Brennan Dyball[2] reports a case of secondary parotitis which terminated fatally following operation for gangrenous appendicitis. Four days after the operation the right parotid gland became swollen, tender, and gradually increased in size. The fever increased and the patient evidenced other symptoms of sepsis. It was not until the eleventh day that a small spot of softening was detected. Under chloroform anæsthesia the abscess was incised by Hilton's method and liberated no more than half a drachm of thick pus. Subsequently other abscesses were opened, but the patient died on the fifteenth day after the operation and eleven days after the onset of parotitis. In English, American, and French literature only 6 cases of fatal parotitis have been reported. Death in this case was evidently due to the virulence of the infection.

Cervical Lymphatic Nodes. Dollinger[3] publishes a more detailed report of the so-called subcutaneous operation which he recommended last year for the removal of tuberculous glands of the neck. He claims that the method is applicable to all lymphatic glands, no matter whether situated in the posterior cervical triangle, along the course of the parotid vessels, in the submaxillary region, in the region over the parotid, or behind the ear. He reports his final results upon a series of 128 cases, in 107 of which the wounds healed *per primam*, and in the remainder after more or less prolonged suppuration. The advantage which this operation has over those in which the incision exposes the field of operation is wholly a cosmetic one. After the parts have been shaved and thoroughly disinfected just within the margin of the hair, in the region behind the ear, beginning on a level with the external auditory meatus for a distance of about 6 cm., the incision is carried down to the sheath of the splenius capitis, care being taken to avoid the occipitalis minor nerve. The further course of the operation varies according to the situation of the glands. The author claims that the removal of the glands can be thorough enough to prevent recurrence; even if glands too small to be seen or felt by the subcutaneous manipulations should be overlooked and left behind, the adoption of proper hygienic measures will prevent any recurrence of the previous condition. According to the author, if the glandular swelling has existed for a period of from two to four years, this of itself is a sufficient guarantee that the tuberculous process in that particular case has run its course. Without having had any personal experience with this operation, I cannot but feel that on general surgical principles the operation is not one which will appeal to the surgical profession. The tendency of modern operations for the removal of tuberculous glands of the neck has been in the direction rather of a more extensive incision and correspondingly more thorough and radical removal of the affected chain of glands. It is difficult to conceive how with any safety or assurance one could remove chains of glands which are situated deep along the course of the vessels beneath the sternocleidomastoid muscle, extending sometimes down as far as the clavicle, and especially, as is so often the case, when the capsules of the glands are adherent to such important structures as the contents of the carotid sheath, and surround such important structures as the spinal accessory and hypoglossal nerves. True, the author does not attempt to carry out his operation in those cases in which the tumor is not freely movable; but from my own experience I should say it was impossible to determine beforehand to what extent the glands were adherent to the surrounding structures.

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[1] Journal of the American Medical Association, April 30, 1904.

[2] British Medical Journal, April 30, 1904.

[3] Deutsche Zeitschrift für Chirurgie, Band lxxii., Heft 1–3.

Toxæmia Associated with Tuberculous Lymphatic Glands. Previous to the operation for the removal of a large mass of lymphatic glands of the neck, the patient exhibited symptoms of a profound toxæmia. Within ten days of the operation these symptoms had disappeared entirely. Etting[1] has been unable to find in literature any report of a similar condition. Microscopic examination proved the glandular involvement to be of a tuberculous nature.

Effect of X-rays upon Tuberculous Glands. A sufficient number of observations have been made to demonstrate the effectiveness of the

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[1] American Medicine, April 2, 1904.

x-rays in the treatment of tuberculous adenitis. In some cases the glands disappear entirely under this treatment, in others and probably the majority the glandular mass is reduced in size to a greater or less degree. The case which Vale[1] reports presents two interesting features. In the first place the case was one of that exceptional kind in which the course is acute rather than chronic, and the constitutional disturbance very marked. In the course of six months since the onset of the disease, the patient lost fifty-five pounds. The second interesting feature was the rapid restoration to health which followed the application of the x-rays twice a week. In the course of four weeks the swelling in the neck had been reduced in size one-half, and the patient had regained his normal well-being and strength. What remained of the glands were removed by an operation and the diagnosis confirmed by microscopic examination. The patient then developed symptoms of a cerebral lesion, which was assumed to be a tuberculous meningitis; the head was now exposed to the x-rays and, strangely enough, the symptoms rapidly subsided.

Beckett's[2] experience with the x-rays leads him to believe that the x-ray treatment is superior to the operative treatment in many ways. In the first place it avoids the disfigurement of a scar, but, what is still more important, the rays act not only on the glands, but on the primary source of infection, and thus guards against recurrence. The results are so much better, he believes, than by operation, that were it not for the extra time and trouble most persons would prefer it. Not only do the glands disappear, but the patient invariably gains in weight and strength. The effect of the rays upon the tissue seems to continue for some time after the treatment has been discontinued. In what way precisely the x-rays affect the tissue is still a matter of conjecture; the beneficial effect is not attributed to any bactericidal action, but rather to the production of a condition of the surrounding tissue which is inimical to the existence and growth of the bacilli. The duration of treatment varies according to the severity of the case, but, as a rule, from one to three months will be required. Beckett prefers a tube of the highest practical state of vacuum because of its greater penetrability and because he finds that with this tube he can give longer exposures and can use a stronger current before a troublesome dermatitis arises. If the gland has already broken down he drains through a very small opening and applies the x-rays as in non-suppurating cases.

X-rays in Hodgkin's Disease. Under exposure to a very high tube for a period of forty to ninety minutes, the tube being moved at intervals of ten minutes from one area to another, the cervical glands and presternal tumor gradually disappeared. Finch[1] subjected his patient to sixty-two exposures. He seemed to be in perfect health, looked and felt well, and gained fourteen pounds since the treatment was begun. The clinical picture and the results of the blood analysis and a microscopic examination of a section of the glands removed all pointed to the case as one of Hodgkin's disease. Four months after the treatment had been discontinued the presternal tumor recurred and was found to be almost as large as before the treatment had been instituted, but under the influence of further exposures the tumor entirely disappeared.

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[1] Medical News, January 30, 1904.

[2] Australasian Medical Gazette, May 20, 1904.

Pulsating Exophthalmos. It has been contended that true pulsating exophthalmos cannot be casued by a circumscribed *aneurysm of the internal carotid,* that the symptoms only appear if the artery ruptures and the blood enters the veins. The recent report of a case by Barnard[2] is of interest as offering evidence contradictory to this dictum. After a self-inflicted gunshot wound the symptoms of pulsating exophthalmos appeared; the common carotid was ligated and in ten days the pulsation ceased. In removing the bullet, which lay in the petrous bone, a small abscess cavity was opened and evacuated, but the patient died two and a half months after the injury. There was evidence of cerebral compression, caused by a large abscess in the temporosphenoidal lobe which did not communicate with the abscess around the bullet. A careful dissection of the internal carotid was made and the following interesting conditions were noted: (1) a double sacculated aneurysmal dilatation of the intracranial portion of the internal carotid; (2) no arterial communication with the sinus ; (3) the absence of any fracture to account for the aneurysm found at the posterior part of the cavernous sinus; (4) the absence of any noticeable dilatation of the sinus or ophthalmic vein. Here was a case, then, in which all the typical signs of a traumatic pulsating exophthalmos were found to be due to a sacculated aneurysm of the internal carotid artery, and not to an arteriovenous communication; a case in which the lesion followed a head injury without being directly caused by a basal fracture; a case which proves that the signs of pulsating exophthalmos are not necessarily due to the presence of arterial blood in the ophthalmic veins and need not be dependent upon excessive dilatation of these veins.

With reference to the treatment of this condition, Murray[3] voices the almost universal opinion that, once the condition is recognized, surgical treatment should be promptly instituted. Compression of the common carotid, if used at all, should be restricted to cases of idiopathic aneurysm and perhaps to the aged. The percentage of success is so much greater after ligation that this may be said to be the operation of choice. The mortality after ligation in cases of exophthalmos is, according to Murray, 10 per cent., and in a certain percentage of cases—about 6 per cent.—secondary cerebral disturbances have developed. Boden in 1899 collected all the reported cases of traumatic exophthalmos treated by ligation of the common carotid. They were 58 in number, with the following results: cured, 46 per cent.; improved, 35 per cent.; unimproved, 10 per cent.; died, 10 per cent. Thus, in 80 per cent. of cases the operation was followed by cure or improvement; in 6 cases blindness resulted because the operation was done too late. Four of the 6 cases were due to sepsis and hemorrhage, complications which are less likely to occur to-day than at the time when these accidents occurred. Recurrence is due to the establishment of the collateral circulation before the clots, which have formed, became fully organized. Inasmuch as the superior thyroid artery plays such an important part in the establishment of the collateral circulation, Ligouet, failing to secure any improvement after ligation of the common carotid, ligated the external carotid artery just below the origin of the superior thyroid and a complete cure followed. Murray believes tying of the internal carotid offers a better prospect of success, and therefore should be preferred to ligation of the common carotid artery.

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[1] Medical Record, May 14, 1904.

[2] Annals of Surgery, May, 1904.

[3] Ibid., March, 1904.

Altogether 6 cases have been reported in which both common carotid arteries were ligated; 4 of these were cured, 1 was improved, and 1 was a failure. In cases of recurrence after ligation of one common carotid Murray suggests that before resorting to ligation of the other the mass of enlarged and pulsating veins at the inner angle of the orbit should be tied off. This suggestion is based upon the results of a similar mode of procedure recorded by Dollinger and Woodward. The former after the symptoms recurred, through an incision above the supraorbital arch, tied off several small veins and then resected about half an inch of the enlarged and thickened superior ophthalmic vein. Woodward ligated the enlarged veins at the inner angle of the orbit. Both cases recovered entirely.

Cirsoid Aneurysm in the Branches of the Internal Carotid Artery. In addition to the presence of a tumor appearing at the time of birth over the right orbit, but now extending midway to the occiput, there were evidences of pressure upon the right olfactory nerve, the right optic nerve and commissure (caused by dilatation of right anterior cerebral and ophthalmic arteries), the right oculomotor and crus cerebri (caused by dilatation of the posterior communicating, postcerebellar, and subcerebellar arteries), and upon the eighth and ninth nerves by dilatation of the anterior cerebellar artery. The author, Heitmüller,[1] believes ligation of the internal carotid artery would be of no avail on account of the free arterial anastomosis, but he looks forward to some amelioration of the conditions when menstruation is established.

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[1] Journal of the American Medical Association, March 5, 1904.

Extracranial Aneurysm of the Internal Carotid Artery. This is an exceedingly rare condition and one concerning which many mistakes in diagnosis have been made. Werner[1] was able to collect but 11 cases, to which Blauel[2] contributes 1 more. His patient was an elderly woman who for two years had an aneurysm of the internal carotid artery. She suffered chiefly from slight difficulty in swallowing and from the unpleasant effects of the pulsation. As the result of a fall the sac ruptured and the true aneurysm became converted into a false one. The swelling increased so in size that the difficulty in swallowing immediately became very much exaggerated and severe neuralgic pains were complained of. While treating the aneurysm with subcutaneous gelatin injections the aneurysm grew still larger. The patient had a sudden attack of dyspnœa, which was relieved only by a tracheotomy. The continued increase in size of the aneurysm and threatened rupture demanded some immediate intervention. Accordingly the common carotid was ligated and part of the sac extirpated. Blauel's case differed from those which were reported hitherto, especially in its dimensions. The aneurysm was much larger and therefore gave rise to more constant symptoms as a result of pressure on neighboring structures. It is sometimes difficult to differentiate between an aneurysm of the internal or external carotid artery, but when, as in Blauel's case, there is bulging of the posterior wall of the pharynx it is reasonable to assume that the internal carotid is involved. The relation of the internal carotid to this structure easily accounts for this symptom. Another point of diagnostic value is the alteration in the pulse; if the pulse of the temporal artery is delayed one would suspect the external carotid artery was affected, and if the temporal pulse on the affected side is synchronous with that in the other one would suspect the internal carotid. Alteration in the character and retardation of the temporal pulse are, however, not necessarily pathognomonic of aneurysm of the external carotid, for it is quite possible that these conditions might be brought about by pressure of aneurysm of the internal carotid upon the external carotid. The advantages of a positive diagnosis are not only theoretical, since the prognosis will be affected by the seat of the aneurysm. Thus, for example, in those cases in which it is necessary to apply a ligature to the common carotid the prognosis would be very much better if the aneurysm was situated on the internal carotid, because the circulation of the brain had already been somewhat disturbed and diminished. Curiously enough the conservative treatment which was adopted in this case—gelatin injections—was followed by an

[1] Deutsche Zeitschrift für Chirurgie, Band lxvii.

[2] Beiträge zür klinische Chirurgie, Band xxxix.

increase in the size of the aneurysm. Of further interest is the cause of the sudden attack of dyspnœa. The symptoms seem to point to an œdema of the larynx, and it is not unlikely that the increase in the size of the aneurysms interfered with the blood and lymphatic supply of the larynx. The effects of ligation of the common carotid were not only prompt, but surprisingly good. Not only did pulsation disappear immediately after the operation, but never returned. Although the pulsation ceased, the aneurysm did not diminish in size, so that it was necessary to operate again and relieve the effects of pressure still exerted by the aneurysm sac. Accordingly four weeks later the sac was opened, the contents evacuated, and the sac packed with gauze. Briefly stated, the interesting features of this case would seem to be the difficulty attached to the diagnosis; the sudden increase in the size of the tumor, which led to complications endangering the life of the patient; the pharyngeal occlusion, the œdema of the glottis, and the absolute cure following ligation of the artery.

Primary Ligation of Internal Jugular Vein. In all cases in which there is reason to suspect that the lateral sinus is either the seat of infective thrombosis or is likely (chiefly in tuberculous cases) to be exposed to damage during the removal of diseased bone during the operation or the subsequent dressings, Nicoll[1] advocates ligation or ablation of the jugular vein as the *first* step in the operative treatment. Preliminary *ligature* of the jugular vein is an operation of trivial risk. As the primary step in the operative treatment of the case, it is performed with clean hands and instruments. Ligature of the jugular, however, undertaken toward the end of a mastoidectomy when infective thrombosis has been discovered in the sinus, or performed hurriedly after accidental wounding of the sinus, is an operation which, performed with contaminated hands and instruments, carries grave risks of septic complications. *Excision* of the jugular vein, on the other hand, in cases in which, on exposure of the vessel, it is found that the infective thrombosis has extended down the lumen, constitutes an operation of some severity, the dissection extending in most cases from clavicle to mastoid. For this the operator must be prepared, even in cases in which the symptoms have given indication beforehand of the condition of matters revealed by the incision. Secondly, preliminary occlusion of the jugular vein, in cases in which there is reason, before operation on the mastoid, to suspect infective thrombosis of the sinus, constitutes the patient's main chance of recovery. To disturb the walls of a thrombosed sinus in exposing it, to palpate it for evidence of thrombus, and finally to open it and break up the purulent thrombus in removing it with the spoon over a patent jugular channel, sucking in debris with each inspiratory effort, cannot be regarded as sound surgery. Thirdly, preliminary occlusion of the jugular vein, in cases (most often in children) in which there is reason to suspect tuberculous caries, permits the performance of a much more radical mastoidectomy than can be attained in cases where a patent jugular vein converts an accidental wound of the sinus from a comparatively trivial incident to an accident bearing serious disadvantages and grave risks. Among the former is the limiting of the scope of the operation owing to the welling of blood with each expiration or the presence of the gauze plug inserted to check the flow. Such limitation is unfortunate, since cases of tuberculous disease commonly return repeatedly unhealed because of remaining or extending areas of caries. Anything which hinders the operator in his endeavor to radically extirpate the caries renders further operation in the future the more likely. Nicoll has made it now a routine practice to ligate the vein in all cases of mastoidectomy with or without opening the sinus, and in many instances the cases have been treated throughout as out-patients.

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[1] Scottish Medical and Surgical Journal, September, 1904.

Ligation of the lateral sinus preliminary to the removal of a parotid tumor is, so far as I know, a unique procedure. Lambotte[1] carried out this procedure in an operation for the removal of an enormous tumor, and found it so efficacious that he recommends its application to other operations in the cervical regions, as, for example, in the removal of tumors of the pharynx. Ligation of the lateral sinus is in itself a somewhat formidable procedure, and would add considerably to the gravity of an operation. If any precaution against hemorrhage is necessary or advisable it would be a much better plan to arrest the arterial circulation by temporary closure of the common carotid or by ligation of the external carotid.

Subhyoid Bursæ. The gross anatomy of the bursæ of the neck has been studied by a number of observers, but there does not seem to have been given any attention to the histological structure. Andrus[2] has made a number of dissections to confirm the work of other observers and to demonstrate the histological structure of this section. In most cases there was no distinct limiting membrane lining the whole of the cavity, but in places there was a suggestion of such a membrane lined by flat endothelial cells. According to Schafer, the subcutaneous bursæ are more like mere recesses in the subcutaneous areolar tissue than true sigmoid sacs. As a rule, there are but few suggestive symptoms. The latter are proportionate to the size of the tumor and are caused by the mechanical presence of the growth. In many instances these cysts have a tendency to become inflamed and to rupture spontaneously, leaving behind a chronic fistula. The diagnosis between median branchial cysts, thyroglossal cysts, and cysts of the subhyoid bursa may give rise to some difficulty. The important diagnostic feature is the histological structure of the sac. If the wall of the sac is lined by ciliated epithelium the cyst is a branchial or thyroglossal duct cyst; if lined with flattened epithelium it is of bursal origin. In but few of the cases which have been reported has a microscopic examination been made to prove the precise nature of the cyst. By far the most satisfactory method of treatment is complete extirpation. Difficulty has often been experienced in dissecting out the entire sac. After advocating this Weir suggested the injection of the sac with melted paraffin, which was allowed to harden before attempting a dissection. Anderson records two cases which he believes to be instances of subhyoid bursæ, although no histological examination of the wall of the sac could be made.

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[1] Journal de chirurgie et annales de la Société belge de chirurgie, January, 1904.

[2] American Journal of the Medical Sciences, March, 1904.

Status Thymicus. To this condition have frequently been contributed sudden deaths during or immediately after the state of narcosis. If the existence of this condition can be demonstrated it has been regarded as a contraindication to the use of general anæsthesia. Whether or not these sudden deaths are to be regarded as the direct result of the administration of the anæsthetic is a question. Some observers, notably Kundrat, believe that death of patients with status thymicus is not due to chloroform or ether intoxication, but that it is an accident which is due rather to an excitability of the heart or of the nervous system, and might occur under any circumstances when this condition prevailed. Nettel[1] reports from the clinic of von Eiselsberg a case in which death occurred fifteen minutes after the completion of an operation for the removal of an enlarged thyroid gland under local anæsthesia. When the patient left the table there was no cause for immediate alarm. Suddenly the action of the heart was arrested and all efforts at resuscitation failed. The autopsy revealed the condition which Paltauf describes as the status lymphaticus. This is evidently a case in which death could not be attributed to the use of a general anæsthetic, since the operation was done under local anæsthesia.

Polypoid Growths at the Base of the Skull. In the removal of polypoid growths which are of dense consistence, sessile, and have an extensive attachment to the bone, a preliminary excision of the upper jaw affords the best access to the growth and the most effectual means of controlling hemorrhage. Leaving the orbital plate of the superior maxilla intact and fitting an obturator to the roof of the mouth, the resulting deformity will be very slight. This method was adopted by Southam[2] with gratifying results. At first he thought that access could be obtained by simply turning the jaw outward, but as the exposure thus afforded was insufficient he performed a partial resection.

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[1] Archiv für klin. Chirurgie, Band lxxii., Heft 3.

[2] Lancet, April 9, 1904.

Pharyngotomy for the Removal of Foreign Bodies. In the extraction of foreign bodies from the pharynx or œsophagus Quenu and Sebileau[1] recommend an operation the technique of which was elaborated on the cadaver and successfully applied in two cases, once for the removal of false teeth and once of a needle. The operation is, in effect, a retrothyroid pharyngotomy. An incision at least 8 cm. long is made along the anterior edge of the sternocleidomastoid muscle, extending at least 2 cm. above and below the upper and lower margins of the thyroid cartilage. The deep cervical fascia is divided in a line parallel to the cutaneous incision. The muscle is reflected backward and the constrictor muscles searched for. Before exposing these it will be necessary to divide the superior pedicle of the thyroid gland between two ligatures. Directly beneath may be seen the fibres of the inferior constrictor. A hook retractor is engaged in the posterior edge of the thyroid cartilage. By drawing the latter forward easy access to the lower third of the wall of the pharynx below the lingual artery and the main thyrolingual facial vein will be afforded. The wall of the pharynx is now incised and its cavity explored. The simplicity of the operation, the ease with which the pharynx may be explored, and the foreign bodies removed without inflicting undue traumatism, render it, according to Quenu, the operation of choice.

Bursting of Tuberculous Abscesses into the Trachea. Although tuberculous changes in the peribronchial or peritracheal glands are frequently found, it is surprising, as Gancliana[2] points out, how seldom any grave symptoms or serious accidents occur. He reports the case of a child, aged three, who died suddenly as a result of the discharge of the contents of a tuberculous glandular abscess into the air passages. The case was thought at first to be one of diphtheria, and when the dyspnœa became intense a tracheotomy was performed. The child died almost immediately and the true nature of the condition was not revealed till the autopsy. In determining the actual seat of obstruction to the air passages one should always note the character of the voice. In laryngeal obstruction one would expect to find always some alteration in the voice, but when the obstruction is lower down the voice is practically unaffected. This accident almost always happens to young children.

Fatal Hemorrhage After Tracheotomy. According to Taute[3] 85 cases of fatal hemorrhage after tracheotomy have been recorded, and in all but 10 per cent. the subjects were children. In but a small number does the hemorrhage arise from injury to the common carotid. It is estimated that in about 2.5 per cent. of the fatal cases of tracheotomy death is due to hemorrhage. Blood in the sputa and localized pain suggest the presence of an ulcerative area, and should at least warn the surgeon of the possibility of hemorrhage. Usually, however, treatment is of no avail unless it be along the lines of prophylaxis. It is so difficult to control hemorrhage that most cases have been rapidly fatal.

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[1] Revue de chirurgie, June, 1904.

[2] Deutsche med. Wochenschrift, 1904, p. 874.

[3] Beiträge zur klin. Chirurgie, Bd. xli., Heft 1–2.

THE THYROID GLAND.

Lingual Goitre. In the great majority of cases the thyroglossal duct becomes obliterated, but sometimes this is not the case, since we find in adults the whole or parts of the duct remaining. It often happens that during the descent of the thyroglossal duct from the tuberculum impar small diverticula are formed jutting out from the sides of the canal, and these may persist after the atrophy of the duct itself. The epithelium of these diverticula proliferates and thus are formed several masses of glandular tissue similar in structure to the thyroid body and known as accessory thyroid glands. These glands may be divided into two classes, those occurring above the hyoid bone and those below. In 1853 Berneuil was the first to discover a small glandular mass above the hyoid bone. These masses vary in size from a hemp-seed to a pea. They may be encapsulated or free in the deep muscles of the tongue, but as a rule are attached to the hyoid bone by a fibrous ligament, which is supposed to be the remnant of the thyroglossal duct. Histologically, they resemble the thyroid body. It is only when a pathological process is set up in one of these glands that the patient is aware of their presence and applies to a physician for relief. Storrs[1] has been able to collect but 32 cases of lingual goitre, so that it is apparently a comparatively rare affection. Upon analysis of these cases he found that the great majority occurred in women between the ages of fifteen and forty. The preponderance of cases in the female sex is difficult to explain, especially as we know that accessory thyroid glands are very much more common in men than in women. Goitre grows slowly and may exist for years without causing any annoyance, until some unknown cause stimulates its growth and produces symptoms. These are functional and not constitutional, and consist of trouble in swallowing, breathing, and speaking, accompanied by frequent hemorrhages. The first symptom is generally an uncomfortable feeling at the base of the tongue, a fulness in the throat, accompanied by a frequent desire to swallow. The symptom which is perhaps more characteristic than any other is profuse hemorrhage unaccompanied by coughing, vomiting, or pain, and coming on without any apparent cause. The occurrence of hemorrhage is due to the fact that not only the mucous membrane covering the tumor, but the tumor itself is extremely vascular. This rich vascularization is a striking and characteristic feature and of great value in the differential diagnosis. Examination of the mouth, even when the tongue is drawn out as far as possible, may not reveal the tumor, the presence of which is only determined by the use of the laryngoscope. There should be no difficulty in differentiating lingual goitre from malignant tumors, and as to benign tumors the difficulty should arise only in differentiating goitre from a dermoid cyst. Cysts, as a rule, are softer and more fluctuating, their color is yellow or brownish, and their surface not so markedly covered with vessels; while the membrane covering them is thinner and more transparent. They grow more rapidly; there is no latent period; their color is yellow; they lack vascularity and pit on pressure. There have been no postoperative deaths and no recurrences after operation. The only rational method of treatment is removal either through the mouth or through an incision in the superhyoid region. Selection of one of these operations depends upon the size or situation of the tumor. When the tumor is not of very great size and situated rather high on the base of the tongue, and when the patient's mouth is large and the tongue slender, the operation by the buccal route is to be preferred, because it is simpler, easier of execution, and leaves no scar. If, on the other hand, the tumor is large and low, the patient's tongue thick and short and the mouth small, one must then resort to the superhyoid method. Whether through the mouth or through the superhyoid region, the tumor is easily enucleated. The superhyoid operation may be performed as follows: An incision made in the median line from the chin to the thyroid cartilage, the hyoid bone is denuded and divided into halves and the incision carried through the mylohyoid and geniohyoid muscles to the tumor. After enucleation the hyoid bone is sutured with silver wire, and the muscles and gland closed with whatever suture material is desired.

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[1] Annals of Surgery, September, 1904.

Amyloid Goitre. Amyloid degeneration of the thyroid gland has been observed in a very limited number of cases, but 11 having been reported; still in all these thyroid involvement was secondary to amyloid degeneration of other organs. Von Eiselsberg[1] reports a case of amyloid disease of the thyroid gland in a man, forty-eight years of age, who had also amyloid disease of the liver and spleen, ascites, and œdema of the lower extremities.

Owing to the difficulty of respiration and deglutition, of which the patient complained, the enlargement of the thyroid gland was believed to be due to an amyloid growth, and upon its removal microscopic examination revealed a very distinct amyloid reaction, and on the application of the gentian-violet stain there were very few follicles found in the specimen. It was noted that the bloodvessels were not only very limited in number, but contained no blood and had evidently undergone colloid degeneration. This is the first case to be found in the literature in which an amyloid thyroid gland had so surrounded the trachea.

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[1] Archiv für klinische Chirurgie, Bd. lxxiii.

One of the interesting features of the case were the attacks of tetany to which the patient has been subject before he applied for treatment. These attacks may have been due to the almost complete disappearance of the parenchymatous elements of the gland. It is not surprising that in spite of the high-grade degeneration of the gland the attacks were not more marked, since, in carcinoma of the thyroid, where a gland is entirely infiltrated with the new-growth and there is scarcely a follicle left, it frequently happens that the patient remains free from attacks of this sort. The operation was unattended by any complications and the patient made an uneventful recovery. No reason could be assigned for involvement of the other organs.

Goitrous Fistulas. According to Payz[1] fistulous tracts to the thyroid gland may be due to traumatism, to foreign bodies, hydatid cysts, and neoplasms. The majority are consecutive to the evacuation of suppurative cysts. The fluid from the fistula may, according to the nature of the case, be serous, purulent, or hemorrhagic. The fistula may be situated either centrally or laterally, and this connection with the thyroid gland will be recognized by their displacement during deglutition. In most cases they run a chronic course and show no tendency to spontaneous closure. The treatment to be radical involves extirpation not only of the fistula, but the segment of the gland to which it is attached. In cases of long standing there may be so many adhesions to the skin, muscles, vessels, nerves, trachea, and œsophagus that the operation is very difficult.

Intratracheal Thyroid Tumors. There have been but 11 cases of this condition recorded in literature; 5 of these have been reported by Bruns.[2] The diagnosis of this condition is based upon the exhibition of dyspnœa in an otherwise healthy subject and the presence of a flat, subglottic, smooth tumor behind or on the side of the trachea. On account of the inflammatory reaction and possible infection it is generally considered bad practice to attempt to extirpate these growths by the endolaryngeal or endotracheal route. While it is possible that in any subject the administration of thyroid tissue may bring about certain retrograde changes in the tumor, the treatment in older persons should consist in a laryngotracheotomy whenever the symptoms demand intervention.

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[1] Transactions of the Thirty-third Congress of the German Surgical Society.

[2] Beiträge zur klin. Chirurgie, vol. xli., Heft 1–2.

Invasion of the Trachea by Cancer of the Thyroid. Actual invasion of the trachea and œsophagus by a malignant goitre is rather a rare complication. Frequently symptoms referable to the trachea develop, but these are the result of compression and infiltration rather than to the extension of the growth into the lumen of these canals. In looking into this subject Viannay and Pinatelle[1] found that of 173 cases of malignant goitre only 8 per cent. showed tracheal involvement, and but 4 per cent. involvement of the œsophagus. Invasion of the latter will be attended with dysphagia, which may be purely mechanical or partly of nervous origin from compression on the vagi, with hemorrhages from the œsophagus and the regurgitation of blood-stained, glairy mucus. The symptoms of tracheal involvement are always most distressing. The dyspnœa gradually becomes more and more aggravated, until the patient almost suffocates. Frequently the growth from the trachea extends to the œsophagus and perforation follows, leaving a tracheo-œsophageal fistula.

Intraglandular Injections of Iodized Oil. The treatment of uncomplicated goitres by any except surgical measures has practically been abandoned; however, we read from time to time reports of cases which are still being subjected to various procedures of doubtful value. Thus, Dubar[2] reports his success with the administration of 5 c.c. of an oil containing 40 per cent. of iodine. In several instances the goitres shrank to a slight degree after six or more injections.

Surgical Treatment of Goitres. The Mayo Brothers' operative experience during the past fifteen years has been limited to 110 cases. These are summarized as follows: 34 were for exophthalmic goitre, with 6 deaths; 2 were for carcinoma of the thyroid, with 1 death on the third day from sudden collapsing of the trachea. The other, whose trachea was involved, required the permanent use of a long tracheal tube until death occurred fourteen months later. One case was a large lingual thyroid; 2 cases presented enlargements of the pyramidal lobe only, and these tumors were apparently separate from the remainder of the gland. The other cases, numbering 71, with 1 death from pneumonia on the eighth day, presented the various types of adenoma and colloid cystic goitres. In 2 cases there were large areas of calcareous degeneration. One case was a large cyst with sixteen ounces of fluid, and apparently involved the entire gland. Two colloid cystic goitres were very large, one measuring twenty-two the other nineteen inches across the tumor from one side of the neck to the other, and resting upon the sternum. In 3 cases the entire gland was apparently removed, but as this operation was by the enucleation method they considered it probable that there was some active gland tissue within the capsule or an accessory gland present, as there were no symptoms developed which could be attributed to the loss of the gland. As to the operative technique, they prefer the so-called Kocher collar incision, which gives the best exposure and the best cosmetic effect. In certain cases, if it is necessary to obtain more space, they split the lower flap in the centre down to the upper border of the sternum. In some cases the sternohyoid and thyroid muscles are retracted, but if necessary they have no hesitation in cutting a part or all of them and reuniting them by suture during the latter steps of the operation. The subsequent treatment of the tumor itself depends upon certain conditions. If the capsule is thick, equal, and the whole gland has disappeared into one rounded mass, the enucleation method of Socin is preferred; in cases of cysts they can be evacuated and the cyst wall removed. If the tumor is composed of adenomata or large colloid cysts, enough gland material will be left to functionate should it be necessary to remove the whole mass. In those cases—and these constitute a majority—in which the tumor retains the general normal contour of the gland, extirpation of one lobe, after the method of Kocher, is practised; and if there be retrosternal enlargements, these are delivered if possible with this lobe. The isthmus is crushed with forceps and ligated or closed by sutures. An exception to this rule is made when there is any difficulty in raising the lobe from the trachea and recurrent laryngeal nerve. Under such circumstances the capsule is incised under the lateral lobe and allowed to remain, the gland being separated from its surface. Usually free drainage is employed, either through a separate incision or through the vertical median incision above the sternum. In speaking of the anatomy of the thyroid gland attention is called to the attachments of the capsule and to its bearing upon the occurrence of dyspnœa. The capsule behind is divided into two layers, one enclosing the gland, the other passing behind the pharynx and œsophagus and blending with a firm band of connective tissue on each side of the cricoid cartilage. This peculiar formation of the capsule, by making lateral pressure opon the trachea, accounts for the dyspnœa which is often complained of in enlargement of the thyroid, and accounts also for the firm attachment even of large tumors to the trachea.

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[1] Revue de chirurgie, March 10, 1904.

[2] Le Progrès médical, January 23, 1904.

Shelden[1] follows the method of A. Pearce Gould, who advised division of the isthmus as the first step in dealing with the gland. He finds this procedure easier, safer, and more rapid than that usually performed. The inferior laryngeal nerve can be dealt with more safely, the tumors can be removed with much less injury to the gland, and when the dissection is done from within outward the inferior and superior thyroid arteries are more easily and quickly exposed. The operation, as he performs it, is carried out as follows: The gland is exposed by dividing the skin, fascia, and muscles. The next step is to pass a Kocher director or one blade of an artery forceps between the trachea and the isthmus. Usually he removes the isthmus, and in these cases clamps the gland with a stomach clamp between the isthmus and the lobe that is to be left. When one clamp has been applied, a second one is placed close to the first and an incision made between the two clamps. He now turns the isthmus and the lobe to be removed outward and separates the under surface of the gland from the underlying structures with the finger covered with a piece of gauze. This can easily and quickly be done without injury to the gland or to the structures on which it lies. The thyroid arteries are soon exposed as they enter the under surface of the gland. If a transverse incision has been made, the inferior thyroid is first exposed and clamped; if an angular incision has been used, it is easier to expose and clamp the superior thyroid before dealing with the inferior vessel. After the arteries are clamped close to the gland and cut, the removal of the remainder of the lobe is easily accomplished by blunt dissection close to the gland. The veins of the thyroid do not bleed after the arteries have been clamped, and the internal jugular vein, in the great majority of cases, gives no trouble. He used chloroform in most cases; when there was pronounced dyspnœa, local anæsthesia.

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[1] Medical Record, April 9, 1904.

Ricketts[1] prefers partial thyroidectomy as the operation of choice in all forms of goitre. He condemns all the non-surgical procedures, including the use of electricity, the seton, injections, and such surgical procedures as division of the thyroid isthmus and ligation of the thyroid arteries. He prefers chloroform for a general anæsthetic.

In a series of 42 operations for goitre Goris[2] practised intrascapular enucleation in 11 cases, intraglandular enucleation in 13, enucleation with intracapsular or intraglandular resection in 8 cases, thyroidectomies in 4 cases, total thyroidectomy in 1, and modified thyroidectomy in 2 cases. With reference to the indications for these varied operative procedures the author recommends intracapsular enucleation in cystic parenchymatous and parenchymatous cystic goitres situated beneath the capsule. This is the easiest operation and can be carried out in a very short time. Intraglandular enucleation, an operation analogous to the preceding one, is indicated in the same class of cases, and differs only in that it is necessary, upon reaching the tumor, to cut a section of the thyroid tissue. The third method, enucleation with intracapsular or intraglandular resection, is recommended in parenchymatous fibrous goitres in which the parenchyma cannot be perfectly decorticated. Partial thyroidectomies are much more complicated procedures than the three forms of enucleation on account of the necessity of ligating the vascular pedicles and searching for the recurrent laryngeal nerve. The operation is indicated in fibrous goitres which are not enucleable. Total thyroidectomy was called for only in cases in which the gland is the seat of malignant tumor or degeneration.

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[1] American Journal of Surgery and Gynecology, August, 1904.

[2] Bull. de l'Acad. royale de médecine de Belgique, t. xviii., No. 12.

Attention is called to the value of laryngoscopic examination in the diagnosis of those forms of goitre which Kocher has named *struma occulta*, in which the lesion is retrosternal and not visible on the surface. The danger of serious hemorrhage in operations upon goitre has been very much exaggerated. The author has noted that the position of the internal jugular vein is often anomalous, and in cases of goitres of considerable size. Usually this vessel is to be found behind and to the outer side of the goitre, and there is no danger of injuring it if the operator in searching for the vascular pedicles keeps close to the edge of the tumor. In one case Goris found the internal jugular vein upon the surface of the tumor immediately under the sternocleidomastoid muscle. The vein was in front and the carotid artery was behind. According to his views the only real danger of thyroidectomy is asphyxia, although he is not so willing to follow the dictum of Kocher in recommending that all operations be performed without general narcosis. Division of the recurrent nerve is not to be feared when one resorts to enucleation or intracapsular resection rather than thyroidectomy. In one case the nerve was divided, but in the course of a few months the patient recovered her voice entirely.

Operative Treatment of Graves' Disease. Each year, it seems, more operations for the relief of Graves' disease are being performed. The opinion among surgeons generally, I believe, is in favor of the operative treatment in certain selected cases, although this mode of treatment has not won over the approval of the internist; so that, as a rule, most of the cases which come into the surgeon's hands have already run the gauntlet of all known remedies at the hands of one or more physicians. It is our duty from now on to publish our successful cases, and at the end of five years to sum them up, and if possible put upon a satisfactory basis the indications for operative intervention.

The rule of the Mayos[1] concerning cases of Graves' disease which have come to them for operation is to operate if the patient's condition is fair, but if the pulse is from 130 to 160, or if it suddenly fluctuates in tension and rapidity, or if there is anæmia with swelling of the feet, the patients are placed upon the belladonna treatment for some days. The more severe types are also given *x*-ray exposures in addition, which is continued for two to six weeks. The operation which they perform is partial thyroidectomy. They do not wish to be understood as objecting to operations upon the cervical sympathetic, and recognize that good results have thus been obtained. They have used as anæsthetics cocaine, chloroform, and ether, the latter preceded twenty minutes by $\frac{1}{6}$ of a grain of morphine hypodermically. Cocaine is chosen for some of the worst types of nervous disease, especially with the rapidly fluctuating or irregular pulse, or if they lack confidence in the anæsthetist. It is interesting to note that they have been able to see no difference in the character or degree of shock or thyroidism in local or general anæsthesia. Ether is preferred to chloroform or cocaine. If during the anæsthesia mucus accumulates in the trachea and bronchi, the patient is allowed to come out of the anæsthetic sufficiently to clear the throat and then chloroform is substituted. The results are based upon their operative experience of 40 cases. Of those which survived the operation, 50 per cent. made an early recovery, 25 per cent. did so after several months, and 25 per cent. were improved, yet suffered from irregular recurrence of some of the major symptoms. There were 6 deaths. One occurred upon the table, 2 within the first twenty-four hours after operation, and 3 at from twenty-four to seventy-two hours. All these cases suffered from thyroidism and exaggeration of the previous symptoms. In their opinion thyroidism is not due to rough handling of the unbroken tumor, and in so doing forcing secretion into the veins, for if this was the case it would be equivalent to a hypodermic injection into the vein with an immediate effect, when in reality it comes after some hours and is due apparently to absorption of the wound serum with some thyroid secretion in suspension. For this reason wounds after operation for exophthalmic goitre should be drained as freely as would a septic process, and in order to check absorption either in the wound or gland the patient should be given sufficient amount of saline solution to replace the quantity of blood which was lost.

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[1] Medical Record, November 5, 1904.

Ligation of the Thyroid Arteries. Kocher, to whom we are so inclined to refer, concerning the operative treatment of goitre, still recommends in certain cases ligation of the thyroid arteries, or a combination of ligation and resection of the gland. The most important points in his mind are to reduce the vascularity of the gland and to avoid long and extensive operations. Schwyzer[1] was impressed with the rationale of this operation and carried it out in five cases, all of which were of a severe type and failed to respond to the numerous remedies which had been recommended as beneficial. On the first patient he performed three operations, first ligating the right inferior thyroid artery, later the right superior thyroid artery, and finally the left inferior thyroid artery. In the second case he ligated two inferior thyroid arteries and one superior at one operation. In the third, two from each superior thyroid arteries were found and ligated, but the operator could not find the left inferior thyroid artery. In the fourth case both the superior and the right inferior artery were tied, and in the fifth case partial thyroidectomy of the right lobe was practised. With the exception of the last case the symptoms were all alarming and the failure of non-surgical measures and the critical condition of the patient demanded operation. Four of the five cases recovered. The fifth died suddenly about four months after the operation, without apparent cause, after a most satisfactory disappearance of all the symptoms.

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[1] St. Paul Medical Journal, January, 1904.

Resection of the Cervical Sympathetic. Jonnesco[1] is still a strong advocate of this operation in the treatment of exophthalmic goitre. He still believes it to be the operation of election, that it is both rational and efficacious, and should be practised on the whole of the cervical chain of ganglia, and in addition on the first thoracic ganglion. It is safer, in his opinion, to perform the operation in two stages, and the results of the operation may not be expected for some time, there often being a period intervening between the operation and the date of improvement, in which the symptoms are for a time exaggerated. In the form of goitre which is presented in Basedow's disease resection of the sympathetic is contraindicated at first, the operation of election in such condition being a partial thyroidectomy. Resection of the sympathetic should be reserved for those cases in which the associated symptoms of the general disease are not relieved.

The X-rays in Exophthalmic Goitre. Having noted that the lymphatic system was greatly sclerosed in operating upon several cases of cervical adenitis which had been exposed for many times to the *x*-ray, Mayo[2] applied this treatment to ten cases of very marked exophthalmic goitre with the hopes, first of reducing glandular activity, and, secondly, of reducing absorption by its possible effect upon the lymphatics. Not any of the cases have been absolutely cured, but certainly they have been markedly benefited. Indeed, the benefit is such that he believes this method should soon be given a place in the treatment of Graves' disease, or at least should be made a preparatory treatment to the prospective surgical method. In all of these cases the symptoms were well developed, and in all of them other measures, medicinal and otherwise, had been tried and failed. In two of these the patients had recovered to such an extent that a diagnosis would at the present time be impossible.

Serum Treatment of Exophthalmic Goitre. Murray[3] regards the symptoms of exophthalmic goitre as due to a toxin, the toxin being developed in the diseased thyroid gland, and although the infectious origin of Graves' disease cannot be proven, he thinks there is no reason why an antitoxin cannot be obtained by the same methods which one would employ in cases of tetanus or diphtheria. Accordingly, he attempted to prepare an antitoxic serum by injecting rabbits with from 5 to 10 minims of liquor thyroidei for a period of about five weeks. The serum was decanted from the blood into small sterilized bottles to which 0.2 per cent. of carbolic acid was added. In the cases in which he employed the serum no very definite results were obtained, but he believes that if larger animals were employed and larger doses of thyroid extract administered, it would be possible to obtain a serum which would be efficacious in both acute and chronic cases.

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[1] Bull. et mém. de la Soc. de chir. de Bucharest, 1904, No. 6.

[2] Medical Record, November 5, 1904.

[3] Lancet, August 27, 1904.

Does Metastasis Occur in Benign Tumors? That a metastatic lesion could develop secondary to a benign tumor would seem at first sight to be paradoxical, since we are so in the habit of regarding this phenomenon as rather pathognomonic of malignant growths. And yet there are some exceptions. It has been demonstrated that chondromata may become generalized to such an extent that secondary deposits may be found in the lungs, heart, brain, and spleen. The same may be said to be true of cystic adenoma of the ovary. It has also been proven that myxomata may recur locally and even become generalized. Can the same be demonstrated of benign tumors of the thyroid? Patel[1] has collected 18 cases, including 1 not hitherto reported from Jaboulay's clinic, in which the bearer of an ordinary goitre of many years' duration, in whose internal organs, especially in the bones and the lungs, secondary growths had developed of a structure similar to the normal thyroid, without the goitre having undergone any apparent modification. Histologically considered, these growths belong to one of two classes, the benign and the malignant. The symptomatology of this condition is one of its most interesting features. In the first place there is nothing particularly noteworthy in the tumor itself or in the thyroid gland, because frequently the goitre is so small that its presence is unobserved. The duration and size of the goitre seemed to have nothing to do with the production of metastases. Secondary deposits are usually found in the bones and lungs, and the bones most usually involved are the skull, pelvis, and vertebræ. It often happens that there is nothing to indicate that metastatic lesions have developed, especially when they are situated in the internal organs. A metastatic deposit in the cranial bones, however, may give rise to symptoms of cerebral compression and those of the vertebral column to symptoms resulting from compression on the spinal cord, as in the case reported below by Hugnenin. As to the etiology, two hypotheses have been advanced by way of explanation. Housell believes that they originate in the parathyroids, while others, notably

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[1] Revue de chirurgie, 1904, vol. xxxix., No. 3.

Eberth and Wolfler, believe that in spite of its benign character the primary lesion is malignant. The majority of those who have studied the histology of these lesions, however, do not favor the latter theory. The treatment of these metastatic lesions may be either medical or surgical. Jager has tried opotherapy, but without success. When the metastatic deposits were situated in the long bones, the limb has been amputated, but Patel does not think that this is advisable, since one cannot be sure that there are not lesions elsewhere. Feurer operated upon a patient with a metastatic focus of the skull, and was obliged to penetrate into the cerebral lobe on account of the extension of the secondary deposit into the brain substance. It is generally believed to be better surgery to regard the lesions so situated as inoperable. In the case which was reported by Patel from Jaboulay's clinic a benign goitre had been stationary thirty years. It was uniformly hard and there were no pains, either spontaneous or on pressure. A metastatic tumor developed at the inner angle of the orbit in the left frontal bone. The tumor was removed and revealed parts in which the characteristic feature of normal thyroid tissue were exactly reproduced, while in other fields the picture was typical of a malignant growth.

METASTASIS FOLLOWING LESIONS OF THE THYROID GLAND. Using for his text a case which came to autopsy, at which was found a carcinoma in a colloid goitre with a single metastatic lesion in the thoracic vertebræ, resulting in kyphosis and myelitis, Hugnenin takes exception to the view that metastasis ever follows the existence of benign lesions, particularly adenomata, in the thyroid gland. In those cases in which metastatic lesions have been found, a carcinomatous area in the thyroid must have been overlooked. If clinically it is difficult to determine whether a thyroid exhibits any change, it is doubly hard to determine whether a recognized increase in the volume of the gland is merely a struma or a carcinoma with the help of a microscope. It is hard to distinguish between a carcinoma and adenoma and simple goitre. This is due to the fact that but few of the features, upon which the distinction is usually based in differentiating between benign and malignant tumors of other tissues, can be relied upon in making a differential diagnosis between various tumors of the thyroid. For example, in tumors of the breast one makes a diagnosis of carcinoma if the cell nests are not surrounded by a basement membrane; while this is of great significance in cases of carcinoma of the breast, it is of little value in the thyroid gland, because the normal and even strumous thyroid contain solid "zellstrange" not surrounded by a basement membrane.

Those modern authors who believe that a struma or adenoma will lead to metastasis do not explain how the thyroid cells gain access to the circulation. They can enter the bloodvessels, according to their views, by breaking through the vessel wall; this is precisely the way in which the cells of carcinoma gain access to the vessels. All the hitherto published cases of struma and thyroid adenoma which have led to metastasis I regard simply as carcinoma; those cases which were discovered only secondarily, and especially those in which it was proven unquestionably that the vessels were filled with masses of the neoplasm. Carcinoma of the thyroid differs from carcinoma of other organs in that it metastasizes chiefly through the bloodvessels. In the author's case this is the only way in which metastasis could have occurred. A retrograde metastasis through the lymph channels could not have existed, since no carcinomatous lymph glands could be found. If a retrograde metastasis through the lymph channels is improbable in Hugnenin's case, then should it be excluded in those cases in which metastases have been reported as occurring in the humerus and femur. Since, in Hugnenin's case, the lungs contained no secondary nodes, then must metastasis have occurred in one of two ways: either the malignant cells passed unhindered through the capillaries of the lungs, or through a patulous foramen ovale. In Hugnenin's case, as in the case of Gierkes, the foramen ovale was patulous.

Metastatic involvement of the vertebræ following carcinoma of the thyroid is not very common. Timacher noted it only once in 38 cases which had given metastasis. In investigating the question as to whether malignancy is much more apt to occur in those thyroid glands which are already the seat of a pathological condition, the author has collected statistics from which he concludes that malignant disease of the thyroid develops most commonly in a thyroid gland which has been proven by microscopic examination to have been already the seat of alteration in structure. In these statistics he finds also that malignant tumors of the thyroid are more common in women than in men, and that carcinoma is more frequent than sarcoma in the ratio of 7 to 5. The author sums up his conclusions as follows:

The primary tumor from which the metastatic lesion of the vertebræ originates is a simple carcinoma of the thyroid. This is a polymorphocellular carcinoma. It is comparatively benign and grows more slowly than does the metastatic lesion. There are no undisputed cases in which normal strumous or adenomatous thyroid has led to metastasis. Carcinoma of the thyroid is oftentimes so small that it might escape notice even after careful microscopic and macroscopic examination. The histological structure of the primary node and its metastasis remind one very often of the normal thyroid of the adult.

Thyroid Grafting. Christiani[1] has been investigating for a long while the ingrafting of thyroid tissue. His experiments have been conducted largely on animals. In his recent communication, however, he reports the results of his investigations in man. There were 3 cases in which he tried thyroid grafting. The first was that of a young woman from whom a portion of normal thyroid tissue was removed during an operation upon the neck. Her thyroid gland was normal and sections from it were implanted in her back between the shoulders and into a myxœdematous boy of twelve, whose thyroid gland had been removed. This boy was grafted with normal thyroid tissue from the first case and also with sections from his own gland, while the woman was grafted with sections from her own thyroid as well as those from the boy. As a result of an examination of portions of the transplanted sections of tissue which were excised from two to six months later, the author concludes that it is possible to graft thyroid tissue in man and that in so doing he can obtain neothyroid glands. It was also proven that when normal or only slightly altered tissue was used the experiments were successful, but when a section from a distinctly pathological gland was employed the graft underwent degeneration. The question as to whether thyroid grafting may be employed as a substitute for thyroid feeding is one which naturally suggests itself. Christiani is inclined to believe that thyroid grafting would avert the cachexia struma priva which develops after a too radical extirpation of the organ. When the subject is suffering from almost suppression of the thyroid function, the demands on the transplanted thyroid tissue are so great that the graft undergoes degeneration as a result of hyperfunction, but when the subject already has a normally functionating thyroid gland the graft atrophies from disuse. It is probable that the best results will be attained when but moderate demands are made on the grafts, as, for example, after a partial thyroidectomy.

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[1] Semaine médicale, vol. xxx., No. 11.

THE THORAX.

Mammary Gland. HYPERTROPHIED BREAST OF THE MALE. Jones[1] reports 2 cases of *gynæcomastia*, both occurring in boys who were members of a very primitive tribe of natives in Central Africa. In both cases the breasts were well developed and presented all the characteristics of the female breast in an individual of the same age. The increase in size was due mainly to dense fibrous tissue, but the number of acini were not less than would be found in the male gland.

SCIRRHOUS CARCINOMA OF THE MALE BREAST. The case, which was under Bell's[2] observation, was a well-marked one. The patient was fifty-six years of age and did not present himself for treatment until four years after the onset of the growth. At this time there was a large, excavating, ulcerated surface, the edges of which were hard, raised, and everted. The condition began as a small, hard lump about the size of a pea two and a half years previously. This had gradually enlarged until it was the size of a hen's egg, and then began to ulcerate. The growth and all the underlying fascia and muscle, together with a few small glands from the axilla, were removed and the defect covered with grafts. The patient noticed a recurrence fifteen months after the operation in the stump of the pectoralis major muscle. Soon there was evidence of internal metastasis, and from the effects of this he died, one year and nine months after the removal of the primary growth.

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[1] Lancet, March 26, 1904.

[2] Liverpool Medico-Chirurgical Journal, January, 1904.

SUPERNUMERARY BREASTS. The patient was thirty-eight years old, married, and when first observed by Young[1] she was nursing a baby four weeks old. On the left breast about 6 cm. below the nipple was another, somewhat smaller, but well formed, from which milk flowed whenever she nursed from the upper one. From external appearances these anomalies can be divided into two types: one polythelia, when multiple nipples grow upon what appears to be one breast, and polymazia, when the nipples appear on other parts of the body connected with a certain amount of isolated breast tissue. Supernumerary breasts are usually small and illy developed, but they are apt to increase in size during pregnancy. They are found, as a rule, along two lines which run from the anterior border of the axilla to the pubes, and are inclined to symmetrical arrangement. However, they are often irregularly distributed. The most interesting phase of the subject, of course, is the etiology. Various theories have been advanced as to the manner in which transplantation takes place. Young summarizes these as follows: "Ahlfeld says that by pressure of the amnion part of the cells become separated and are transplanted to other portions of the surface of the body. Förster and E. Hartung hold the same idea as to portions of tissue becoming separated, but express no opinion as to the manner of its occurrence. According to Leichtenstern many previously considered accessory breasts the result of aberration of the milk ducts, probably from the work of Meckel and Owen. St. Hilaire sought to trace polymazia back to the general plan of the lower mammals, and Darwin thought it due to atavism. Leichtenstern, Neugebauer, Billroth, and many others consider it a reversion to the previous types of our ancestors. Perls, on the other hand, has strongly combated the view of atavism, and Duval explained the axillary, as well as those appearing upon the back and acromion, as modifications of the sebaceous glands. Champneys has also advocated this view. However, Virchow remarks that it is not so easy to tell with which one is dealing, as their development is so similar. E. Martin believes that certain parts of the breast tissue are cut off from the mamma and lie near to the true breast. These are often felt as tumors, and swell with pregnancy and menstruation, but are not true accessory breasts. They may even appear in the axilla. Flechsig held much the same view for this class of cases, and Hartung gave to these structures the name of 'mammæ accessoriæ spuriæ.' The theory of reversion to some previous type has evidently the greatest number of adherents among the writers upon these subjects, and certainly offers the most satisfactory explanation for the appearance from time to time of these rather interesting deformities. For the anomalous position of such as occur on the outer side of the thigh and on the back some further explanation must be sought, and possibly in these very rare cases the transplantation theory of Ahlfeld may be correct. As regards the nipples which appear as accessories of the main nipple of the breast, the theory of Förster offers an adequate explanation and one in keeping with the embryological development of the organ. Neoplastic changes, according to E. Martin, are so rare in supernumerary breasts that he finds only one doubtful report in medical literature besides his own. At the same time he considers that the small 'lobuli aberrantes' about the breast should be watched and removed if they are the cause of discomfort, as new growths appear at times to start in these structures."

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[1] Boston Medical and Surgical Journal, March 24, 1904.

GALACTOCELE. In the classification of cysts of the breast one finds mention of the galactocele, a cyst which is due to obliteration, complete or partial, of the milk duct. The condition is indeed extremely rare. Keen[1] can only remember having seen the following case in his experience, in which he has probably seen from 800 to 1000 cases of breast specimens: The patient was a woman, twenty-nine years of age, who had a lump in her breast almost as long as she can remember, and believes that it began about the time her menstruation was first established, at twelve or thirteen years of age. At first it was only about the size of a lady apple. She was confined March 8, 1903. When she was about three months pregnant the tumor began to grow. At the time of her confinement it was about twice as large as at the present time. After her confinement the tumor began slowly to shrink. The breast contained milk after her confinement, but the nipple was flat and retracted, and she did not nurse the child from that side. When admitted to the hospital the tumor occupied more than one-half of the left breast, involving all of the inner lower quadrant and parts of the two adjacent quadrants. It was 10 cm. in diameter, was rather firm, markedly lobulated, elastic, not attached either to the chest wall or the skin. Apparently, the skin, however, was attached to the septa dividing the lobules. The nipple was flat, but not retracted; milk could be expressed from the nipple. There were no glands perceptible in the axilla or neck. The urine was normal. An elliptical incision was made, through which the entire breast was removed. The skin over part of it was so thin that in spite of the utmost care two of the smaller cysts were opened. Practically the entire mammary gland was involved in the cystic change. Upon section it was seen that the major part of it was one large galactocele, measuring about 6 cm. in diameter, with a number of subsidiary cysts of smaller dimensions. An examination of the milky fluid, which in some of the cysts was quite thick and creamy, showed it to be made up almost wholly of globules of fat. The pathological diagnosis was galactocele, acute non-suppurative interstitial mastitis, and slight chronic productive mastitis. According to Ziegler it sometimes happens that certain changes take place in the milk, and these excite inflammation and proliferation of the fibrous stroma.

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[1] Annals of Surgery, August, 1904.

In Keen's specimen there was in the stroma a marked periacinous infiltration of mononuclear cells and some increase of the interlobular and intralobular fibrous tissue. Many of the acini and ducts showed marked distention, several of which had coalesced to form cysts. The latter were lined by one or several layers of cuboidal or slightly flattened cells, and composed a fibrous wall, which in many instances was quite thick. In some of the cysts there was distinct evidence of proliferation of cells over those lining the cyst wall. In describing the symptoms and diagnosis Keen says the appearance of the tumor is generally rather sudden, usually soon after parturition, or at least during lactation, without any inflammatory changes, and with only the pain and discomfort incident to the tension and weight. Some of these tumors become excessively large. Scarpa reports one in a patient just the same age as the one reported, which occurred ten days after her confinement, and from which ten pounds of milk were evacuated. Milk was demonstrated to be present in the breast of the present case by pressure upon the tumor, which caused the milk to escape from the nipple. The content of such tumors varies extremely; sometimes it is like simple human milk; sometimes, when the watery parts have been absorbed, it is changed, as in this case, to an extremely rich cream, almost as thick as castor oil. Gross states that they may be filled with what appears to be pure oil, which coagulates into a substance resembling lard intermixed with crystals of margarine. In other cases the contents are like butter or cheese. In other words, all or any of the various products from milk may be present.

Primary Tuberculosis of the Breast. Tuberculosis of the breast is an uncommon affection, and those cases in which the mammary gland is primarily affected are still more rare. In the history of some of the larger surgical clinics, perhaps not a single case will have been observed.

Unless the case comes to autopsy one cannot establish upon a scientific basis the primary nature of the mammary infection. There remains a possibility of the existence of a tuberculous lesion unrecognized in the thorax or abdomen, but for practical purposes we must consider a tuberculous infection primary if there is no evidence of tuberculosis elsewhere, and providing, of course, that the histological picture of tuberculosis or the typical bacilli were found in the specimen or the presence of bacilli proven by inoculation experiments. On this basis Anspach[1] has by a process of exclusion collected 42 cases, 30 of which were taken from the table of Bartsch. In an analysis of the entire number of the accepted cases we find that 28, or 70 per cent., were married; 19, or 47 per cent., had children; 12, or 30 per cent., were single; 6, or 15 per cent., had a history of trauma; 8, or 20 per cent., suffered from mastitis during lactation; and 2, or 15 per cent., were directly inoculated.

No case up to this time has been observed before the age of puberty. The relative infrequency of tuberculosis of the mammary gland, as compared with genital tuberculosis, is alluded to by Hegar, Martin, and others, who explain this disparity on the ground that infection plays a very important part as a predisposing factor in genital tuberculosis, acting very much as trauma in preparing the soil for a later invasion of the tubercle bacillus. Several varieties have been described, such as the nodular or discrete, the confluent, miliary, etc.[2] The prognosis of mammary tuberculosis is on the whole favorable, provided there are no visceral complications. In most cases, if a radical operation is performed, it should consist of an amputation of the breast and the removal of enlarged axillary glands, and the patient will recover. During the period of lactation the possibility of this condition should always be borne in mind, since if the breast itself is the seat of tuberculosis its milk must be highly infectious. One case is reported in which the tuberculous record of the child has been traced to its mother's milk. Of course there are many instances of infection arising directly from the milk of tuberculous cattle, even when the udder was not involved. Included in Anspach's review of the subject is the report of a case in a multipara, fifty-nine years of age, with no tuberculous history, and no clue whatever to the probable source of infection; she had always used both breasts during lactation, and never had any pain in them. Three years before coming under observation a nodule appeared in the right breast; it increased slowly in size, and caused retraction of the nipple. The breast was amputated, and upon examination there was found in the region of the nipple an irregular nodule about the size of a walnut, not circumscribed, but fusing with the surrounding tissue. The microscopic picture was typical of tuberculosis, but no tubercle bacilli were found in the stained sections, and no animal inoculations were made.

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[1] American Journal of the Medical Sciences, July, 1904.

[2] PROGRESSIVE MEDICINE, March, 1904, p. 93.

The following is a case reported by Thurston:[1] A female, aged thirty-six, Hindoo. Four months before admission the patient noticed a swelling in the right breast and also in the axilla; the swelling in the breast increased, and finally an abscess burst. On admission the upper outer quadrant of the right breast was enlarged and indurated; in the centre of the indurated area was a small sinus discharging thin seropus; the skin was adherent. The axillary glands were enlarged, hard, and not painful; there was also another enlarged gland in the left axilla and several scars in the neck, the remains of previous abscesses. The breast was treated with a hot lead lotion and the induration largely disappeared, but the sinus persisted. The area surrounding the sinus and the axillary glands were removed; the latter were typically tuberculous to the naked eye, and the microscope confirmed the diagnosis.

CHRONIC MASTITIS; DIFFUSE FIBROADENOMA; MALADIE CYSTIQUE. Chronic induration of the breast with some enlargement in whole or in part is very commonly observed in middle life. This enlargement may be due to chronic interstitial mastitis or to diffuse fibroadenoma, or to a malignant tumor. In some instances it is possible to distinguish a chronic interstitial mastitis from a diffuse fibroadenoma, but the two conditions may appear in different parts of the same breast, and in some cases it may be impossible to determine whether the process found is an inflammation or a new-growth. Both may simulate carcinoma in their clinical and physical characteristics. Curtis and Wood[2] report a series of cases as types of these interesting conditions. The clinical picture is, in the words of Curtis, usually as follows: In a woman in middle life (whether single or married, childless or multiparous, appears to be of no consequence) an induration takes place in one or both breasts, involving the entire gland, or forming a distinct nodule in one portion. We rarely find the rest of the breast perfectly soft and healthy, even if the superficial examination reveals only one definite nodule. It is seldom that the patient has suffered from any injury or abscess formation which might be considered a cause of the changes. When the process is localized or limited to one nodule, a more or less distinct mass is felt, moderately hard, not freely movable in the breast, but rarely attached to the skin or deep fascia. If a cyst of any size be present the mass is usually elastic, but it is often hard and sometimes of stony hardness like carcinoma. Fluctuation can seldom be demonstrated, the tension and fluid pressure within the walls of the cyst being so great. Small cysts feel like shot or beans embedded in the tissues of the breast, and the larger ones, surrounded as they often are by thick, indurated walls, may exactly resemble a small carcinomatous nodule. Usually a nodular or granular induration can be felt in the rest of the breast by careful examination (pressing the gland gently against the chest while palpating with the fingers, especially at the margins), even when the patient complains only of the more evident portion or prominent tumor. When the disease has advanced equally in all parts of the breast the entire organ feels indurated, uneven on its surface, and when grasped between the fingers gives the impression of being made up of numerous nodules. In a certain number of cases there may be some adhesion of the skin and even retraction of the nipple, in spite of the denial of Bryant and other aut orities that adhesion of the skin and retraction of the nipple are never felt except when carcinoma is present. A retraction of the nipple which is evident before operation occasionally disappears in the breast after removal, probably because of the loosening of the fibrous stroma which had drawn upon the nipple. The axillary glands are sometimes enlarged from inflammatory reaction, and they may be tender to pressure, but they are not so hard as is sometimes the case in carcinoma. As illustrating adhesion of the skin and retraction of the nipple, they quote two cases from several which they have seen.

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[1] Indian Medical Gazette, January, 1904.

[2] Medical News, August 13, 1904.

From the pathological point of view, according to Wood, three general types of these growths may be observed. The first, those in which the breast has recently been the seat of subacute inflammation, enter the ducts and involve the periglandular connective tissue. The process is rather a low-grade inflammation, and is attended with an increase of the periglandular connective tissue, desquamation of the glandular epithelium, and the formation of cysts. The second type are those which are more distinctly adenomatous in character, of which there may be said to be two varieties: in one the glandular acini are filled with masses of cells which have grown out from the walls of the cells, and in the other the lumen of the acini or of the cyst is filled with a papillary outgrowth which simulates an adenoma. In the third class of cases—the transition cases with malignant changes—the breast may contain a small, mobile tumor, with all the clinical and gross anatomical appearance of an adenoma, and yet carcinomatous changes may have taken place in some portions of the tumor and already invaded the axillary lymph nodes. It is rather characteristic of these tumors that, although the axillary lymph nodes are involved, only a minute portion of the tumor may be malignant, and the greatest patience is required to find the carcinomatous area. Thus the danger of relying on an examination of a small section of such a tumor removed for diagnosis.

The prognosis in these cases depends somewhat upon the stage of their development, especially upon the degree of induration. If there is marked induration, the possibility of its being malignant is greater than when induration is only slight. Curtis lays considerable stress upon the degree of induration, as he believes it constitutes the most reliable sign of the degree of pathological change and the consequent danger. The diagnosis from other lesions except carcinoma is usually easy. The object of Curtis' paper is rather to show that it is not important to distinguish these conditions from carcinoma, because they are so frequently followed by malignant changes that they should be considered practically preliminary stages of that dangerous neoplasm. For all practical purposes, therefore, these tumors should be treated as cases of early breast carcinoma. Curtis believes that the treatment may be varied according to the extent and degree of the induration, and attempts to classify the cases according to this basis. This it seems to me is rather an unwise procedure, as in hands more experienced than the author's mistakes may be made which would be detrimental to the interests of the patient. It is a very much better plan to recommend amputation of the breast in all these cases than to outline any complicated rules by which exceptions to this plan of treatment may be made.

CYSTADENOMATA. In his report of two cases of cystadenomata Keibel[1] takes exception to some of the statements made by Schimmelbusch in his original description of these tumors. In the first place a positive diagnosis cannot be made easily, and often the breast has been amputated as for carcinoma when the tumor proved to be a cystadenoma. In certain cases the axillary glands may be involved and, as in one of Keibel's cases, the tumor may be adherent to the skin. Furthermore, recurrence has been noted. The appearance in the microscopic picture of the signs of an inflammatory process were not observed by Schimmelbusch; Keibel advocates the operative treatment in all cases because of the tendency in a certain percentage of cases, about 10 per cent., to malignant degeneration. With von Bergmann, however, he does not believe it necessary to amputate the breast, for if the tumor recurs a second operation may be performed.

SUSPICIOUS TUMORS OF THE INVOLUTING BREAST. In discussing the attitude of surgeons as to what is the best treatment of a small, doubtful tumor in a woman past the menopause, Stewart[2] takes exception to the views which were expressed by Abbe, in which the latter stated that in 40 per cent. of cases with cystic disease of the breast the tumors were benign in character. Abbe's recommendation to treat these cases by simple puncture and aspiration cannot fail, Stewart says, to do immense harm by justifying the general practitioner in the adoption of a method which must result in fatal delay and dangerous dissemination in all malignant cases so treated. Probably 10 per cent. of the tumors are malignant. Stewart recommends that an exploratory procedure be adopted which would be so executed as to safeguard the patient against any possible dissemination of the malignant growth. The technique of such an exploratory operation might consist in a direct section of the tumor, a procedure which has certain disadvantages, in that during the manipulations the cells of the malignant growth may become disseminated; or amputation of the breast in all cases after the pedicle containing all lymphatics leading to the axilla has been clamped with forceps, *until the tumor has been examined.* In the latter case the incision should be planned so as to permit of a radical operation in case it has been found to be malignant, and as a matter of convenience the breast should be cut loose. In order to prevent infection the pedicle should be divided with the actual cautery or a piece of gauze stitched over the cut end of the axillary pedicle during the remainder of the operation. By this technique the only tissues which by any chance could be infected with cancer are removed after the larger operation is completed. The author concludes by stating: first, there is a lamentable and unnecessary difference of opinion among surgeons as to the treatment of doubtful tumors of the breast; second, all tumors of the breast in patients over forty must be considered malignant until proven benign; third, most of such tumors demand amputation with exploration of the tumor, and a complete Halsted operation if there is then doubt as to benignancy; fourth, an exploratory procedure should be planned to avoid contact of cut lymphatics with any tissues left behind, and any chance of dissemination of cancer cells by pressure before the removal of the breast; fifth, *x*-ray treatment, aspirations, or any but radical treatment are objectionable, as causing delay and dissemination.

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[1] Berliner klin. Wochenschrift, 1904, No. 30.

[2] Journal of the American Medical Association, August 6, 1904.

ANGIOMA OF THE BREAST. In the breast an angioma is a very uncommon tumor. There have been not more than ten authentic cases published; of these one was reported by Malapert and Morichau-Beauchant,[1] occurring in a girl aged twelve. The tumor was noticed fifteen days after birth, but did not commence to grow until she was six months old, since which time the growth has been progressive, but without pain or disturbance of function. In this case the tumor was situated in the right breast beneath the nipple, and had attained to the size of an orange; it was soft, fluctuating, non-encapsulated, and intimately associated with the breast tissue; it was composed of three large cysts and a number of small ones. Certain varieties of angiomata have been recognized, as, for example, the cutaneous, subcutaneous, and intraglandular. They are all of congenital origin and appear at or soon after birth.

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[1] Revue de chirurgie, February, 1904, vol. xxix., No. 2.

The Operation for Mammary Cancer. In discussing this subject Handley[1] calls attention to the fact that it is very much more important to remove a large area of the underlying fascia, and not so important to remove extensive areas of the skin. This opinion of his is based upon the assertion that breast cancer spreads not only in the lymphatics of the pectoral fascia underlying the breast, but through the network of fine lymphatic vessels in the deep fascia in every direction. He has found the channels of the deep fascia lymphatic plexus obstructed even as far as the groin. The subcutaneous nodules which one finds in the skin are not due to primary invasion of the superficial cutaneous lymphatics, but to secondary invasion from the fascial lymphatics. Invasion of the lymphatics of the breast occurs centrifugally, like a water-weed, along a network of irrigation channels, invading the deep fascia in ever-widening circles around the primary growths. It is a significant fact that Watson Cheyne, who has the best published operative results, lays great stress on the removal of a wide area of deep fascia along the lines laid down by Stiles. It should be the operator's aim, therefore, to remove as widely as is practicable a circular area of deep fascia, above, externally, internally, and downward, even as far as to a point three inches below the tip of the ensiform cartilage. Speaking of the skin incision, the latter should fulfil the following conditions: The sutured incision should not form a straight line. If it does the skin tension must be all in one direction—that is, at right angles to the line of the sutured incision; whereas, when the incision is curved or sinuous or triradiate, the pull of the stitches acts in various directions, and the surrounding skin will be dragged in from all the points of the compass and will more easily cover the raw area. The incision should not be parallel with the fibres of the pectoral muscle, and should not lie along the anterior fold of the axilla. In this situation its contraction will tend to bind the arm to the side, and it is along the anterior fold of the axilla, in the line of the lower border of the great pectoral, that a reserve of loose skin is required to allow for abduction of the arm. If possible, therefore, the line of the axillary scar should avoid this situation. Lastly, the incision along the anterior fold of the axilla is in a situation where the patient can readily see and feel it, and the æsthetic factor in the operation should not be neglected, save for good reasons. It is, I believe, possible to devise an incision which, without any sacrifice of safety or convenience, will fulfil the preceding conditions. The incision which he uses may be considered as consisting of three parts: A ring incision, as practised by Mitchell Banks, accurately centred on the growth and surrounding it at a safe distance, slightly tailing off into (1) above and into (2) below. A curvilinear incision for giving access to the axilla. The axilla is opened by turning forward a flap of skin whose base lies along the anterior axillary fold. The axillary incision begins at the lower edge of the great pectoral, close to its insertion. It ends—also at the lower edge of the great pectoral—by joining the annular incision (*a*). It crosses the base of the axilla, and marks out an almost semicircular flap of skin, whose convexity reaches back nearly to the edge of the latissimus dorsi. It affords perfect access to the axilla and good drainage afterward. A linear incision coming off from the lower and inner part of the annular incision and passing downward for about two inches along the linea alba. Its object is to give access for the removal of the deep fascia over the upper part of the abdominal wall. Without it this important step in the operation cannot be properly carried out. It would be most convenient to close the incision in the triradiate form.

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[1] British Medical Journal, October 1, 1904.

Fig. 9.

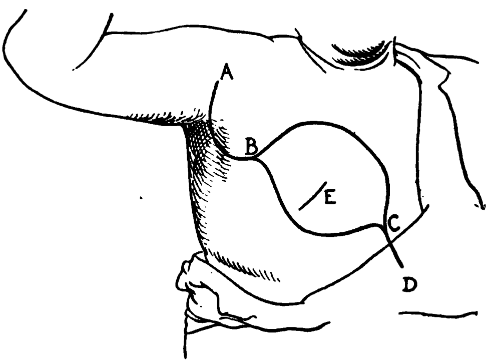

Fig. 10.

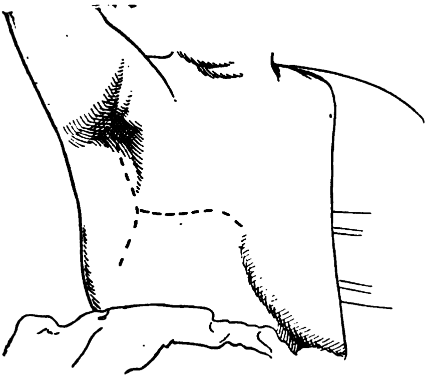

Fig. 9.—Case of mammary carcinoma, adherent to skin and muscle, operated upon at the Samaritan Hospital, January, 1903. A B, axillary flap incision; B C, annular incision circumscribing the growth; C D, incision to allow of removal of epigastric deep fascia. E is a deep pucker in the skin, produced by the contraction of the growth. The epigastric part of the incision C D, though indicated for convenience on this figure, was not actually carried out in this case, since I had not at the time realized its importance. The deep fascia was, however, very widely removed.

Fig. 10.—A recent photograph of the same case, showing the triradiate scar resulting from the incision A B C in Fig. 9. No recurrence has so far taken place (July, 1904). The scar has become freely movable on the thorax, and the pull of the arm has stretched it nearly to the width of an inch. The movements of the arm are practically unimpaired.

Heart. It is gratifying to note, in the perusal of the literature of the past year, a number of contributions upon the surgery of this organ. While the development of this field of surgery dates but a few years back, we should not forget that many years ago Roberts recommended operative intervention for the treatment of traumatic and inflammatory lesions. It was Roberts who proposed that the diseased pericardium should be treated as the pleura in similar pathological conditions. In 1876 he recommended incision and drainage of the pricardium if the fluid contents were purulent. In 1881 he advocated heart suture for wounds of the cardiac wall, and in 1897 devised a formal method of attacking the pericardium and heart by a trap-door resection of the costal cartilages. It has only been of more recent years, however, that the procedures which at one time seemed hazardous are now resorted to without hesitation when the indications present themselves. It may be of interest from the historical point of view to refer to some of the contributions which mark the progress in the development of this field of surgery. In April, 1897, Rehn presented to the Congress at Berlin the first patient who recovered after suture of a wound of the heart. In 1898 Terrier and Reymond presented a monograph on the surgery of the heart and pericardium, which was followed in 1899 by a memoir by Loisson. In 1898 Lannelongue operated successfully upon a case of ectocardia, and at about the same time Baudouin conceived the idea of applying surgical measures to the separation of xiphophage monsters. Later Delorme proposed an operation for the removal of adhesions in pericarditis, and, finally, Tuffier originated massage of the heart as a method of resuscitation in case of syncope.

PARACENTESIS OF THE PERICARDIUM. Roberts[1] reports two cases of paracentesis of the pericardium. In both cases he used the Roberts pericardial trocar. The needle was introduced in the first case in the fourth left interspace, over the apex beat to a depth of about 3½ cm., and three ounces of a very bloody serum were withdrawn. Three days later the pericardial sac seemed to have refilled ; the operation was repeated, and four and a half fluidounces aspirated. Previous to this two other attempts had been made unsuccessfully. The patient died early the following morning; the autopsy showed that the pericardial cavity was nearly free from fluid, and revealed a small ecchymotic area on the surface of the heart, which might have been caused by contact with the trocar. In the second case he introduced the needle in the fourth right interspace close to the sternum, and withdrew three drachms of slightly reddish fluid. He punctured again in the fifth left interspace over the apex beat, and, although the trocar seemed to strike the heart, no fluid escaped. The patient died a few days later, and at the autopsy no fluid was found in the pericardium, and no mark was found or wound of the heart, although this might have been concealed by the deposits of lymph which were found on the heart surface.

DRAINAGE OF THE PERICARDIUM. Pendlebury[2] reported two cases of drainage of the pericardium, one of which died. In operating for exposure of the pericardium the author prefers a vertical incision to one along the lower border of the seventh rib, because it gives access to the sac without interfering unduly with the attachments of the rectus muscle, and because it permits the operator to proceed at once with the removal of the sixth costal cartilage, if this becomes necessary. He divides the triangularis sterni with the intercostal membrane and muscle up to the sixth costal cartilage, pushes aside both the right and left pleura, and, in order to avoid opening the peritoneal cavity, incises the pericardium just above the level of the base of the ensiform cartilage.

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[1] American Journal of the Medical Sciences, September, 1904.

[2] Lancet, October 22, 1904.

Traumatic Hæmopericardium. A little girl, two and one-half years old, fell from a windowsill on to a needle. The needle penetrated the chest near the right edge of the sternum, and later worked its way into the pericardium. Two weeks after the accident the patient began to complain of pain in the side, respirations were grunting in character, and physical examination demonstrated the presence of fluid in the pericardium. Morse[1] practised paracentesis and withdrew a considerable quantity of fluid, after which the child was very much relieved and rapidly recovered. He selected the fifth right interspace at the edge of the sternum as the point at which to introduce the needle, believing, with others, that at this point the pericardium can be most safely and most easily reached.

Surgical Aspects of Pyopericarditis. Based upon his experience with three cases in which the pericardial sac was opened and drained, Le Conte[2] discusses the surgical aspects of pyopericarditis. No operation should be performed without exploratory puncture being made. From certain observations which he had made upon the cadaver, he concluded that the point of election for paracentesis for exploratory puncture is in the fourth and fifth interspaces, as close to the edge of the sternum as the needle can be made to enter. In this position there is the smallest chance of penetrating the pleura, and the internal mammary vessels should lie well to the outer side of the needle. If no fluid is withdrawn and there is no evidence of penetration of the heart by motion imparted to the needle, the fourth interspace should be tried, and if this also fails to demonstrate the presence of fluid, the same interspace one and a half to two inches from the left border of the sternum should be tried. The only treatment which should be considered in the presence of pyopericarditis is incision and thorough drainage. Paracentesis will at all times relieve temporarily urgent symptoms, and should be employed without hesitation. In the majority of cases the operation should be performed under local anæsthesia, since in the presence of a large collection of fluid the heart action is embarrassed and the administration of a general anæsthetic becomes dangerous. It might be advisable, when the condition of the patient justifies the administration of an anæsthetic, to practise excision of the costal cartilages rather than intercostal incision. The latter, however, is the safer operation of the two, and should be followed in the majority of instances by recovery without further operative intervention. If the pericardium is much distended ith pus the overlying pleural cavity is almost certain to be obliterated; that the incision can be made through it without risk. The point of ection for incision is the fourth left interspace, beginning one inch from e sternal border and extending to the normal position of the apex beat f the heart, about one inch internal to the anterior mammary line. Vhen the pericardial sac is opened the pus should be allowed to flow ut slowly, so as not to embarrass the heart by the sudden relief of pressure. An intercostal incision produces no shock, is the simplest procedure in grave cases, and permits of a more extensive operation at a later period if found inefficient. The first of the operative cases was one of pneumonia, in which pericarditis was recognized on the thirteenth day. Paracentesis gave immediate but only temporary relief. Intercostal incision was followed by complete convalescence at the end of six weeks. The second case was a case of croupous pneumonia, developing a pericardial effusion on the sixth day. The pericardium was drained through an intercostal incision. Convalescence was uninterrupted. The third case developed a pericarditis secondary to a septic condition of the extremities. This operation was followed also by recovery.

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[1] Boston Medical and Surgical Journal, March 3, 1904.

[2] American Journal of the Medical Sciences, September, 1904.

Mintz[1] operated upon a little child with pyopericarditis, draining the pericardium through an opening made by resecting the fifth costal cartilage. Inasmuch as the opening did not drain the deepest point of the pericardial sac he concluded to make another opening farther down. An incision was made along the lower border of the seventh costal cartilage, and after separating the attachment of the abdominal muscles and diaphragm he exposed the pericardial sac, opened, and drained. This method of approach was suggested almost a century ago by Larrey in the treatment of a patient with a stab wound beneath the seventh rib. Inasmuch as the patient was suffering from evidences of cardiac compression, Larrey dilated the punctured wound and evacuated a large quantity of pericardial fluid. After a number of observations made upon the cadaver, Mintz elaborated the following technique: An incision 7 cm. in length is made along the border of the seventh costal cartilage. The attachment of the abdominal muscles is separated from the under surfaces of the rib, a section of which is removed. The internal mammary artery crosses the wound and should be ligated. With one finger the operator compresses the diaphragm and exposes to view the angle of the pleura, and also, somewhat higher and toward the median line, the pericardial sac. If the latter is opened at this point one is assured of thorough drainage, inasmuch as the opening is made in the most dependent portion.

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[1] Zentralblatt für Chirurgie, 1904, No. 3.

SUTURE OF THE HEART. I have taken pains during the past two years to collect and tabulate all the cases of heart suture recorded in literature. Up to and including 1903[1] my list comprised 60 cases. Since then I have found 2 cases which escaped my notice in 1903 and 11 cases reported in 1904, making a total in all of 73 cases. The following is a brief record of the cases which appeared in various journals during the current year:

Renon's case.[2] The patient shot himself with a revolver, the ball entering the fourth interspace, 4 cm. from the left sternal border. Under chloroform anæsthesia sections of the fourth and fifth ribs were excised and upon enlarging the pericardial wound a violent hemorrhage followed. The cardiac wound was found at the apex of the left ventricle and closed at first with the finger, then with two catgut sutures. At the conclusion of the operation the patient was in collapse; he died thirty hours after the operation. At the autopsy it was seen that the suture had held perfectly and that there had been no leakage.

Three cases by Orzymowski.[3] The first, a young man between twenty-five and thirty years of age, who received a stab wound of the thorax, which penetrated and caused a wound 2 cm. long in the apex of the heart. The wound was closed with three deep and two superficial sutures. The patient died two days later of pleurisy and purulent pericarditis. The second case, a young man nineteen years of age, who sustained three wounds of the heart, which were closed with silk sutures, and a wound of the pleura. Though the wound and pericardium became infected the patient eventually recovered. In the third case there were two wounds of the heart, but only one of these was discovered at the operation. The patient died two days later and the autopsy revealed a second wound about 2 cm. above the first; the edges of the wound were, however, adherent, and hemorrhage had evidently been arrested. There was also a pleurisy and purulent pericarditis. The author has observed in heart wounds a fuller pulse in the right than in the left radial artery. Smith[4] operated upon a patient with a penetrating wound of the right ventricle thirty minutes after the receipt of the injury. Sections of the fourth and fifth ribs and a portion of the sternum were resected. The cardiac wound was closed with a continuous silk suture, but, inasmuch as bleeding continued, a few more interrupted sutures were introduced. The patient was apparently on the road to recovery, but died suddenly on the seventh day. The wound in the pericardial sac and heart had firmly united, but the heart and left ventricle were covered with a plastic inflammatory exudation. Vogel's[1] patient sustained a penetrating wound involving the anterior wall of the right ventricle, as well as the pleura. The wound was exposed by resecting the fourth and fifth costal cartilages and closed with five interrupted silk sutures. The pericardial sac was not drained. Two days later there was evidence of fluid accumulation in the pericardial sac, and the patient became restless and dyspnœic. The pericardium was reopened and a quantity of turbid serum evacuated. Despite this complication the patient recovered. The case which Kappeler[2] reported was of especial interest because it is the first in which recovery has followed a wound of the auricle. While a considerable number of cases have recovered after suture of the ventricles, of the 41 previously reported cases of injuries to the auricles not one has recovered. It is well known that injuries to the auricles are of very much more serious character than injuries to the ventricle. This is due principally to the fact that the wall of the ventricle is very much thicker than the auricle, and that the contractures of the ventricle wall during systole tend to spontaneous closure of the wound. Injuries to the auricles are so extremely dangerous and tend so rapidly to a fatal termination that very rarely have opportunities been offered to apply surgical measures. It should not be forgotten that even in wounds of the auricle immediate death is the exception rather than the rule, so that frequently an opportunity is offered to apply active measures. Three hours after the injury the patient was in a state of collapse, but with no physical signs pointing definitely to a wound of the heart. However, owing to the situation of the wound and the desperate condition of the patient, exploration seemed justifiable. Upon reflecting a flap including the third and fourth ribs toward the sternum a wound of the pleura was discovered 3 cm. long in the third intercostal space, and a wound of the pericardium 1½ cm. long, from which a stream of bright-red blood was expressed. The wound in the pericardium was enlarged and revealed a stab wound of the wall of the auricle about 1 cm. long. With each diastole a small stream of bright-red blood gushed out, while in systole the bleeding ceased. Without any especial difficulty the wound in the auricle was closed with a continuous silk suture, the pericardial sac was thoroughly cleansed, and the wound of the pericardium was closed. During the period of convalescence an empyema developed which required resection of the rib for drainage. The patient, however, eventually recovered. Commenting upon the technique of the operation the author says that the suture of the wound was accomplished without especial difficulties, since the auricle does not make as great "*bewegungsexkur-*

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[1] PROGRESSIVE MEDICINE, March, 1904, p. 118.

[2] Tribune médicale, 1904, No. 3.

[3] Medycyna, 1904, 25–30

[4] Southern California Practitioner, September, 1904.

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[1] Zentralblatt für Chirurgie, 1904, No. 22.

[2] Deutsche Zeitschrift für Chirurgie, Bd. lxxii., Heft 4–6.

sionen" as does the ventricle. The first suture had to be introduced with a free hand, but afterward the wound could be steadied by making traction upon the suture and the introduction of the remaining sutures was extraordinarily easy. In the pericardial sac a great quantity of the blood clot was found, not in the anterior, but in the posterior and inferior portions.

Stewart's[1] case had been stabbed in the chest with a rusty penknife. Under ether anæsthesia the operation was begun about forty-five minutes after the infliction of the injury. Upon resection of the third and fourth ribs he found a wound in the pleura and anterior edge of the left lung and in the anterior wall of the left ventricle. The lung was collapsed and the pleural cavity contained a large quantity of fluid blood. The cardiac wound was closed with a continuous silk suture, and during the introduction of the suture the coronary artery was injured, but hemorrhage from the wound was easily controlled with an additional suture. The pericardial sac and pleural cavity were drained. The patient was discharged from the hospital fifty-six days after the operation.

Schubert's case[2] has a twofold interest, both on account of the recovery of the patient and the peculiar situation of the wound. The injury was a self-inflicted gunshot wound which involved the pleural cavity and lung as well as the heart. The presence of a large hæmothorax was manifest, but there was some doubt about the involvement of the heart. At the operation, however, upon opening the pericardial sac, two wounds, one in the anterior and one in the posterior surface of the heart, were discovered, but from neither of these was the hemorrhage profuse. Both wounds were small and were closed with catgut sutures. The very moderate hemorrhage from the heart wounds Schubert explained on the supposition that the bullet did not enter the cavities of the heart, but simply penetrated the septum, and he made some investigations upon the cadaver which seemed to show that such an occurrence was quite within the range of possibilities. Of the 70 cases of wounds of the heart which have been subjected to operation, but a very small number, probably less than 10, have been due to gunshot wounds. Of these 3 were in the left and 2 in the right ventricle. The fact that relatively so few cases of gunshot wounds of the heart have come to operation is probably due to the fact that in most cases the bullet penetrates the heart and causes two wounds, a wound of entrance and of exit, which will permit of a rapidly fatal hemorrhage, whereas in the case of stab wounds the instrument usually penetrates only the anterior wall, and the character of the wound as compared with a gunshot wound is such as would not allow of as free hemorrhage. Schubert's case recovered without any complication.

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[1] American Journal of the Medical Sciences, September, 1904.

[2] Deutsche Zeitschrift f. Chirurgie, October, 1904, Bd. lxxv., Heft 1.

The tenth case of the series was a stab wound of the left ventricle. Stude[1] exposed the heart by the Rydygier incision and closed the wound with silk suture. Death occurred on the table, while the external wound was being closed.

The eleventh case. A man, with suicidal intent, forced the blade of a penknife between the fifth and sixth ribs at the apex beat. After the knife had remained in this position for half a minute, being surprised and disappointed that he was still alive, he withdrew the knife and reinserted it directly above the first wound, between the fourth and fifth ribs. He left the knife in position and noticed the handle move up and down with each cardiac systole. Not satisfied with this, he rotated it twice. Five minutes later he was, in a state of profound collapse, removed to the hospital and operated upon fifty minutes after the injury. A musculocutaneous flap was reflected, exposing the two wounds. The interspaces were so wide that it was not necessary to resect the ribs. The stab wound in the fourth interspace was enlarged, exposing a wound in the pericardium. This later was lengthened and a wound three-eighths of an inch in length was found in the left ventricle. The aperture of the wound was plugged with some lacerated myocardium. The myocardial wound was closed with three interrupted silk sutures, the pericardial sac cleansed, its wound partially closed, and drainage introduced. The stab wound in the fifth interspace had wounded both the pericardium and pleuræ. The patient reacted promptly and eventually recovered completely from the effects of the injury.

The following is a table of 11 cases not included in the series of 39 cases published in PROGRESSIVE MEDICINE March, 1903, pages 102 and 103, and the table of 21 cases published in PROGRESSIVE MEDICINE March, 1904, pages 118 and 119:

No.	Operator.	Chamber wounded, and size of wound.	Results and remarks.
61.	Renon.	Apex left ventricle; 2 catgut sutures.	Died thirty hours after operation.
62.	Orzymowski.	Apex of heart, wound 2 cm. long; suture.	Died two days later, of pleurisy and purulent pericarditis.
63.	Orzymowski.	3 wounds of heart and wound of pleura; closed with silk sutures.	Recovery.
64.	Orzymowski.	2 stab wounds of heart; 1 found at operation and closed.	Death two days later.
65.	Smith.	Penetrating wound right ventricle; continuous silk suture and interrupted sutures.	Died on seventh day; heart and left ventricle covered with plastic inflammatory exudation.

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[1] Deutsche militärartzliche Zeitschrift, 1904, Heft 1.

No.	Operator.	Chamber wounded, and size of wound.	Results and remarks.
66.	Vogel.	Penetrating wound involving anterior wall of right ventricle, as well as pleuræ; five interrupted silk sutures.	Recovery.
67.	Kappeler.	Stab wound of wall of auricle about 1 cm. long; continuous silk suture.	Recovery.
68.	Stewart.	Wound of anterior wall of left ventricle; suture and drainage of pericardial sac and pleural cavity.	Recovery fifty-six days after operation.
69.	Schubert; operation by C. Lauenstein.	Wound of heart septum between ventricles.	Recovery
70.	Stude.	Wound of left ventricle; silk suture.	Death occurred on table.
71.	———	Wound of left ventricle; silk sutures.	Recovery.

SUMMARY.

	Cases.	Per cent.
Total number of cases	71	
Number of deaths	40	56
Number of recoveries	31	44

	Cases.	Died.	Recovered.	Mortality.	Recovered.
Right ventricle	22	15	7	68	32
Left ventricle	35	16	18	49	51
Right auricle	3	1	2	33⅓	66⅔
Left auricle	0				
Apex	3	2	1	66⅔	33⅓
Coronary artery	1	1	..	100	
Septum between	1	..	1	...	100
Seat of wound not stated	7	5	2	71	29

MASSAGE OF THE HEART. With the exception of Haag's, Starling's, and Inglerud's experiences, the results of massage of the heart upon man have been practically *nil.* Though recovery has ensued in such a small percentage of cases, the interest of the profession in the subject is still keen, and experiments are still being conducted with the hope that further elaboration of the technique or the addition of supplementary measures may enable us to save a greater number of lives. Kemp and Gardner[1] have recently published the results of their experimental researches on resuscitation after death from chloroform. They succeeded in resuscitating 11 out of 23 animals after absolute cessation of the heart action to sight, touch, and compression of the heart, and that too after the heart had remained in that condition for variable periods of time without any efforts at resuscitation. The animals lived from two to twenty-four hours, and in most of them body function returned to normal, and they became active and hard to control. The autopsies demonstrated in some cases that the sutures were torn out, death probably being due to the collapse of the lung or secondary hemorrhage. As a result of their experiments they express the belief that this procedure is both therapeutically sound and perfectly justifiable in all cases of death from chloroform or from any anæsthetic, from drowning or allied conditions, when all other means of resuscitation have failed. Remembering that the return to life may not occur until some time has elapsed, one should persist in attempts at resuscitation for at least an hour to an hour and a half. The technique of the operation which they recommend consists in making an incision over or slightly below the apex, and if necessary resecting a small piece of the fifth and sixth ribs. The animal is placed in Nelaton's position, as this thrusts the heart against the chest and somewhat upward; the index finger is passed over the margin of the heart and behind it near the apex, and pressure is made upon the heart against the chest. While massage of the heart is the most important and the essential factor in attempts at resuscitation, there are other measures which, though supplementary, should be regarded as equally indispensable. As Keen pointed out, it is not the mere stoppage of the heart, but the cessation of other concomitant vital phenomena that are concerned in the processes, and the mere starting of the heart action is not sufficient always to restore the patient. Blood pressure must be restored and the respiratory centres must be stimulated; therefore, in addition to the massage of the heart one should resort to infusion of adrenalin and salt solution and to artificial respiration. The temperature of the normal saline solution, as Dawbarn has demonstrated, should be 120°. At such a temperature the solution may reach the heart at about 110°, which is a little above the temperature of aortic blood (102.5° to 103.5°). Inasmuch as heat, however, is a cardiac stimulant itself, it is important that the saline infusion should be of as high a temperature as one can with safety employ. Artificial respiration may be practised by one method or another, or by the use of Fell-O'Dwyer apparatus. Kemp and Gardner have devised an intubation tube which is practically an O'Dwyer tube with a hollow needle. There is a small opening on the upper surface of the tube which by means of the thumb can be regulated as an expiration valve. This instrument possesses the merit of cheapness and simplicity, and is much less liable than the Fell-O'Dwyer instrument to damage the soft parts. Intubation of the larynx is, in their opinion, the only accurate method of securing artificial respiration. They call attention to a portable pump, constructed in the physiological laboratory of Columbia University, which can be easily regulated and is extremely useful in resuscitation in cases of collapse on the operating table, in drowning, in cases of opium poisoning, and in respiratory failure in the newborn. It is so constructed that it can be run by electricity, gives the proper inspiratory and expiratory pauses, and can be so regulated in power and rapidity as to be adaptable both to small animals and to man.[1]

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[1] New York and Philadelphia Medical Journal, May 14, 1904.

Mention should be made of the experiments of D'Halluin,[2] who suggests the possibility that the heart might be catheterized by way of the jugular vein and the oxygenated venous blood reinjected into an artery, thereby simulating autoinfusion. According to the author the principal cause of failure seems to be a fibrillary trembling under the influence of massage, but this may be obviated by introducing one electrode into the rectum and applying the other to the ventricle after the manner suggested by Batelli. The latter observer noted that when the oxygenated blood entered the coronary arteries the fibrillary tremors began, but they were arrested by turning on a current of 240 volts for a second or two.

Although the operation was performed in 1901 it was not reported by Kemp until this year.[3] The patient, a young girl, had already been subjected to several previous operations and had developed pyæmia. To open some metastatic abscesses nitrous oxide was administered and the operation lasted only about five minutes. The patient was somewhat shocked, but rallied after the use of saline infusion and other appropriate remedies, when she suddenly went into collapse and died almost instantaneously. Massage of the heart was practised, but failed.

In Keen's[4] case the heart was masséed without opening the thorax. Just at the completion of a total laryngectomy under chloroform anæsthesia the circulation suddenly failed. After failing with the usual methods to resuscitate the patient the abdominal cavity was opened, and with one hand on the anterior wall of the chest and one within the abdominal cavity the heart was masséed. This was continued for one-half hour, but without avail. Ingelsrud[5] was more successful. His patient collapsed during the performance of an abdominal hysterectomy. Although the abdominal cavity was already open, the heart was exposed through an osteoplastic flap in the chest wall and massaged directly. The action of the heart was restored promptly and the patient recovered.

Foreign Body Embedded in the Heart. In an autopsy upon a patient seventy-six years of age, who died from inanition, Koch[6] found a piece of steel about 3 cm. long embedded in the wall of the left ventricle. There was nothing in the patient's history to give any clue as to the time at which the accident occurred, nor did it apparently cause any personal discomfort nor any changes in the pericardium.

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[1] Both the pump and intubation tube can be secured at Stohlmann & Pfarre, 107 E. 28th St., New York City.

[2] Presse médicale, 1904, No. 44.

[3] New York and Philadelphia Medical Journal, May 14, 1904.

[4] Therapeutic Gazette, April 15, 1904.

[5] Loc. cit.

[6] Berliner klin. Wochenschrift, July 11, 1904.

CARDIOLYSIS.[1] Von Beck[2] reports 3 cases of chronic adhesive mediastinopericarditis in which the operation recommended by Brauer was performed. In all 3 cases there was a left-sided pleurisy, cyanosis, irregular and rapid heart action, engorged liver, ascites, joint œdema; and in 2 cases albuminuria. In the performance of the operation a wide resection was made of the third, fourth, fifth, and sixth ribs on the left side from the edge of the sternum to the anterior axillary line. In all of the cases operation was followed in a short time by marked relief to the heart and improvement of its action. The secondary congestion of the liver and spleen were relieved and the ascites and albumin disappeared. In one case, a boy of eight years, the cure was so marked that two years after the operation he could indulge in active exercise without embarrassment to his cardiac mechanism. In a second case an extensive empyema was drained by the anterior thorocoplasty, the fistula from which persisted, though the cardiac lesion was relieved. At a later operation seven entire ribs, from the third to the ninth, inclusive, were resected back to the vertebral column (von Beck suggests that the mortality of operations upon empyema might be lowered by a two-stage operation). The lesion for the relief of which this operation was performed was due to a chronic pleurisy with secondary tuberculous peripleuritis and empyema of the mediastinocostal sinus of the cardiac notch of the left lung.

Diaphragm. WOUNDS OF THE CHEST PENETRATING THE DIAPHRAGM. There is no doubt but that surgeons as a class are much more apt to apply palliative measures in the treatment of penetrating wounds of the chest where they would not hesitate to recommend immediate operation if the peritoneal cavity and not the thorax was involved. Both American and English surgeons are very conservative in their treatment of chest wounds. In sharp contrast to them stand the French and Italian surgeons, who advise and practise immediate interference in penetrating wounds of the chest and in wounds below the sixth intercostal space. Williams[3] is an advocate of radicalism, and firmly believes that in the majority of cases penetrating wounds of the chest below the sixth intercostal space demand at least exploration. Probing such wounds is of no value, and digital examination is far less accurate than the resection of a rib whereby actual observation and positive diagnosis can be made and direct treatment instituted. The author has had an unusually large experience in this field of surgery, having had opportunity to examine 26 cases of complicated wounds of the chest involving the diaphragm. Of these the first 10, excepting 1 heart case, died from non-interference. Of the remaining number 2 died within three hours of hemorrhage, 1 from a perforating wound of the heart, 1 from embolism, and 3 from infection. Of the remaining 13, 3 died one year, eighteen months, and twenty months, respectively, after the operation. The remaining 7 are living. He records the history of 3 of these cases in order to show how absolutely impossible it would have been without exploration to have determined the nature of the injury, and how inevitably the patient would have died had not immediate operation been resorted to. One of these sustained not only a perforating wound of the diaphragm, but a serious injury to the left kidney, ureter, and trunk of the renal artery; the wound in the diaphragm was closed and the injured kidney removed. In another case there was a stab wound of the diaphragm involving the spleen. In this case the wound of the diaphragm was closed, the splenic wound sutured, and the patient recovered. In addition to the wound in the diaphragm there was in the third case a penetrating wound of the colon.

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[1] See PROGRESSIVE MEDICINE, March, 1904.

[2] Archiv f. klin. Chirurgie, Bd. lxxiii., Heft 4.

[3] Annals of Surgery, November, 1904.

Rona[1] believes, as Williams does, in the urgent necessity for prompt surgical intervention in this class of injuries. Rona operated upon a boy of fifteen, with a stab wound of the chest from which a considerable portion of the omentum protruded. The operation was performed under local anæsthesia, and the wound in the diaphragm, which was about 4 cm. long, was exposed, and closed by the transthoracic route. The patient made an uninterrupted recovery.

Neugebauer[2] reports a case of diaphragmatic hernia immediately following a stab wound and discusses the condition generally. After drinking three litres of beer the patient became engaged in a quarrel and was stabbed in the left thorax beneath the sixth rib. The patient was admitted to the hospital in a condition of collapse, with dyspnœa and a rapid pulse. There were no breath sounds over the left lung, the chest giving a tympanitic note to percussion. The heart was displaced to the right. Under chloroform narcosis the thoracic wound was enlarged, the hole in the stomach was closed, the organ reposited within the abdomen, and the wound in the diaphragm sutured. A secondary incision at an angle to the first was made along the costal margin and the peritoneum opened. The colon and omentum were inspected, and the gastrohepatic omentum opened to allow inspection of the posterior wall of the stomach. The wounds were then sutured and the pleural cavity drained. The patient recovered. Neugebauer then refers to the debated question as to whether the thoracic or abdominal route should be employed when wounds of the diaphragm are suspected. The indications for operation are usually clear—protrusion of the omentum, the escape of chyme through the wound in the thorax, the appearances of the stomach or intestine in the pleural cavity, or especially bleeding externally or into the pleura. But in those cases in which the intestine or omentum herniate into the pleural cavity, some time after the infliction of the wound, the diagnosis is exceedingly difficult, and death may occur from strangulation of the bowel. He cites the following case as an illustration: A man attempted to commit suicide by shooting. The ball entered the left breast 1 cm. to the right of the nipple; no untoward symptoms occurred except slight emphysema, and in six days the patient left the hospital as recovered. Six months later the man began to suffer from abdominal pain, constipation, and indigestion, and two and a half years after the injury he was operated upon for acute intestinal obstruction, at another hospital, when gangrene of the cæcum and ascending colon was found without apparent cause. He died, and at autopsy the entire splenic flexure and a large part of the omentum occupied the left pleural cavity, compressing the lung, and having pushed through a wound in the diaphragm. Had Neugebauer used the *x*-ray and localized the bullet beneath the diaphragm, an immediate operation would have been performed and the patient's life might have been saved.

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[1] Deutsche med. Wochenschrift, June 9, 1904.

[2] Archiv f. klin. Chirurgie, Bd. lxxiii., Heft 4.

Mortality from immediate operation is low, while that of incarcerated diaphragmatic hernia is extremely high. After wounds of the thorax, probably involving the diaphragm, a thorough exploratory operation should be performed for the same reasons that the abdomen is opened after it has been penetrated by a stab or gunshot wound. In comparing the various methods he finds that of 52 transpleural operations there was a mortality of 9.6 per cent., and of 10 abdominal a mortality of 50 per cent., not including the cases of chronic prolapse, which in itself is an extremely grave condition. When the abdominal route is taken the mortality is higher, because of the increased difficulty and time required to perform the operation and of the chance of overlooking injuries to organs immediately beneath the diaphragm, especially the posterior wall of the stomach. On the other hand, pneumothorax occasionally causes a fatality when the transpleural operation is performed. There need be no dispute as to whether to adopt the pleural or peritoneal route, because whether the condition is a wound, a chronic hernia, or an incarceration, it will often be necessary to open both cavities. If the abdomen is opened for diagnostic purposes, it will be found necessary to open the thorax to suture the diaphragm; if the pleural cavity is first opened, it will usually be necessary to perform a laparotomy to reduce the hernia.

Sarcoma of the Chest Wall. The diagnosis in this case was not confirmed by microscopic examination, but the gross appearance of the tumor was such as to suggest sarcoma, and the tumor was so large that it was regarded as inoperable. March[1] undertook the treatment of the tumor with the *x*-ray, and after twenty-six applications the tumor entirely disappeared. Already a year has nearly elapsed since the disappearance of the growth and there is no sign of recurrence.

Pleura. THE TREATMENT OF EMPYEMA. Of recent years there has been a growing tendency to perform more radical operations in the treatment of chronic empyema. The subperiosteal resection of a limited portion of one or two ribs will not suffice in the majority of cases to effect a cure. Voswinckel[2] records the results which have been obtained from Körte's clinic at the Urban Hospital in Berlin after extensive resections of the ribs. In most of their cases a U-shaped musculocutaneous flap, with its base above, is reflected, and not only the ribs but the costal pleura and intercostal muscles removed. The treatment of the parietal pleura varies according to individual cases. In those cases in which there are dense vascular adhesions between the lung and pleura, decortication after Delorme is not resorted to. It is sufficient under such circumstances to make, either with the galvanocautery or with a knife, several parallel incisions down to the lung tissue. As to the immediate results of the operation in 13 cases, 9 survived and 4 died. Although a very large portion of the thoracic wall was removed the stability of the affected side suffered but little; in no case was there any noteworthy curvature of the spine. The function of the arm on the operated side was but very little impaired, usually only to the extent that the patients could not lift heavy objects as esaily as they could before the operation. Of the fatal cases, 1, a tuberculous subject, died ten days after the operation; a second, also a tuberculous subject, died of heart-failure; the third of penumonia, and the fourth of sudden respiratory failure.

While Beck[3] is thoroughly in accord with the principles upon which the Schede operation is based, he does not approve of it being carried out as a routine procedure. In his own practice he prefers, before deciding upon the extent of the operation, to make an exploratory incision, resecting a small portion of the rib which lies approximately over the middle of the cavity, and a portion of the costal pleura as well, regardless of the pleural fistula. He then proceeds to inspect the cavity and determine the extent to which rib resection must be practised. He advocates the removal of the costal pleura as recommended by Schede. In his series of cases, 71 per cent. of the cavities were situated posteriorly and required a resection of the scapula. The callous areas of the pulmonary pleura should also be removed. The cavity is packed with iodoform gauze, and subsequently drainage tubes enveloped by iodoform gauze can be substituted. Irrigations he believes are not only rendered unnecessary, but are in fact harmful. Stress is laid upon early gymnastics and pulmonary exercise, for which dumbbells and wind musical instruments are recommended. The principles which apply to the treatment of empyemata in the more common situations apply also to those at the apex of the pleural cavity. The following is a description of the operation which he recommends for abscesses situated in this region: With the arm at right angles, the incision is made close to the lower border of the pectoralis major muscle in a horizontal direction till it ends at the lower part of the anterior margin of the deltoid muscle. The muscles are then dissected back superiorly until the axillary region is free. The vessels and muscles are grasped by strong blunt hooks and pulled upward. Sometimes separation is possible only by the aid of lateral incisions into both pectorales. Thus, the vessels are temporarily put *hors de combat,* and the ribs can be removed according to the indicated principles. If it is very difficult to reach the first rib by means of the pectoroaxillary incision, the clavicle is to be resected temporarily.

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[1] American Journal of the Medical Sciences, June, 1904.

[2] Deutsche Zeitschrift f. Chirurgie, Bd. lxxv., Heft 1.

[3] Annals of Surgery, March, 1904

Bevan reported to the Chicago Surgical Society[1] the results of an extensive Schede operation which he performed upon a patient who had an empyema of eight months' duration. The ribs from the third to the tenth were resected subperiosteally, and, after lifting up the flap with a powerful pair of scissors, he cut away all of the intercostal tissues, including the pleura, which was three-quarters of an inch in thickness. The patient's recovery was uneventful, and, with the aid of pulmonary gymnastics, the cavity was altogether obliterated.

The attitude of the profession toward the Fowler or Delorme operation, so-called decortication of the lung, is one of conservatism. It certainly is not carried out as a routine procedure, and is not approved of unless as a measure supplemental to costal resection. It adds considerably to the gravity of the operation, both on account of the additional time which it takes to complete the operation and also on account of the additional hemorrhage.

THE LUNGS.

The Treatment of Pulmonary Fistula. Discussing the operative treatment of bronchial fistulæ which arise from the evacuation of suppurating cavities and hydatid cysts of the lung, Garre[2] points out the various methods that may be adopted according to the nature of the case. In those cases in which the canal is short and not surrounded by dense cicatricial tissue, the closure of the fistula may be effected by application of the actual cautery. In many cases, however, this method will not be effectual, and under such circumstances one or the other of the following procedures may be adopted: When obliteration of the tract is interfered with by the presence of a thickened and indurated pleura, the latter should be excised; when there are adhesions of the pulmonary pleura to the margins of the external opening, these should be removed; and when the walls of the fistula are adherent to the overlying rib, more or less of the latter must be resected. The danger of opening up communications with bronchial branches by the use of a sharp curette is emphasized. Very free excision of the ribs should be avoided whenever possible, especially in the young. Atelectasis and shrinkage of the lung may be prevented if the operation for closure of the fistula is undertaken soon enough. In case of atelectasis associated with a bronchial fistula, decortication of the lung seems to be more appropriate than resection of the thoracic wall.

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[1] Medical News, July 3, 1904.

[2] Deutsche med. Wochenschrift, 1904, No. 15.

Lung. Koenig, in an article which he contributed last year, maintained that it was not advisable, in severe injuries of the lung associated with hæmothorax which developed shortly after the injury, to resort to surgical intervention. More recently Grunert[1] takes a more radical view of the situation, in favor of which he cites a number of cases which came under his own observation. One of these cases was especially interesting in that he was able to expose a lacerated wound on the surface of the lung, which was bleeding profusely, and arrest the hemorrhage by closing the wound with catgut sutures. By this prompt and radical measure the patient's life was no doubt saved. The following are his views regarding the treatment of penetrating wounds of the thorax: A large proportion of gunshot wounds of the lung recover spontaneously, but he believes that a large number of patients whose lives would otherwise be lost can be saved by immediate operation, and that not only will lives be saved by prompt intervention, but such complications as suppuration and secondary hemorrhages will be prevented. With reference to gunshot or bullet wounds, he is in accord with the views expressed by Koenig, namely, that in cases of slowly developing hemorrhage, which are followed in the course of twenty-four to forty-eight hours with a gradual filling up of the thoracic cavity, the plan of treatment should be expectant. After a few days a thoracotomy may be performed for the removal of the blood clot. In cases of penetrating wounds where a larger vessel has been injured the physician in most cases arrives too late. But if the case should be seen in time, recourse should be had to immediate operation, which should consist in a thoracotomy and an attempt to arrest the hemorrhage either by ligatures, sutures, or tampon. In case of emphysema, especially at the onset, he would recommend an immediate opening of the thorax. In stab wounds the treatment should be prompt and energetic, since in these cases emphysema, which soon becomes alarming, develops more easily. Finally, in those cases of stab wounds in which the lung has been injured, a thoracotomy should be performed and hemorrhage arrested by finding the bleeding point and closing the wound with sutures.

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[1] Deutsche Zeitschrift f. Chirurgie, Bd. lxxii., Heft 1–3.

Traumatic Chylothorax. Very few cases of traumatic chylothorax have been observed. Hahn[1] has only been able to collect nine cases altogether, one of which came under his own observation. The patient, thirty-nine years of age, shot himself in the thorax, the wound of entrance being between the sixth and seventh interspace, on a level with the tip of the xyphoid process. The patient developed the symptoms of respiratory distress, with intense dyspnœa. These were relieved by aspiration, which had to be repeated several times. In the course of thirty-one days twenty-seven litres of a chylous fluid were withdrawn. At no time was the temperature above normal, and during the period at which the tapping was necessary the temperature was subnormal. The patient eventually recovered, although his weight fell from one hundred and sixty to one hundred and twenty-eight pounds during the first fourteen days of his illness. From the history of the case the author believes that the bullet did not lacerate the wall of the duct immediately, otherwise the chyle would have collected in the pleural cavity much more quickly, but that in all probability as a result of a severe contusion the wall of the duct underwent secondary necrosis.

The result of his case shows that even in grave cases recovery can ensue by such simple therapeutic measures. One should bear in mind that aspiration should be repeated as infrequently as possible, or that the interval should be as long as possible; a better opportunity will thus be afforded for the injury to the duct to be repaired. Whenever the fluid is withdrawn a negative pressure within the cavity is created, so that the wound, though temporarily repaired, may be forced open by the suction created by the negative pressure. The suggestion has been made, and on more than one occasion put into practice, that in those cases in which the reaccumulation of fluid is rapid, and in which therefore aspiration would have to be repeated frequently, it would be better practice to perform a thoracotomy with resection of the ribs, since in so doing the negative pressure would be abolished. The author gives a *résumé* of the history of eight other cases of chylothorax which he has been able to collect.

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[1] Deutsche Zeitschrift f. Chirurgie, Bd. lxxiii., Heft 4–6.

Thoracotomy in Sauerbruch's Pneumatic Chamber. The investigations of Sauerbruch in connection with the construction of the pneumatic chamber were made at the suggestion of Mikulicz,[1] and may be said to be the most sensational contribution of the year to the surgery of the lung. Since the introduction of antisepsis and later asepsis, the advance of surgery has been rapid and progressive, so that to-day there is scarcely a region of the human system that is not approached and explored. To this general statement, however, there is but one marked exception, and that is the surgery of the thorax. The difficulties and dangers which have attended these operations are well known and have stood as a barrier to advances in this particular field. Every broad opening of the thoracic cavity causes a pneumothorax. There is within the thorax a negative pressure of about 7 mm. of Hg., which on inspiration is not increased, nor even in ordinary expiration; only by forced expiration, as by coughing, is the negative pressure converted into a transitory positive pressure. So soon, therefore, as the thoracic cavity is opened the air rushes in and under the effect of the atmospheric pressure causes collapse of the lung, and at the same time the arrest of its function. This disturbance of function is due not only to the collapse of the lung, but to the fact that pressure is exaggerated both upon the heart and the opposite lung. The technique of every operation on the thoracic cavity whch has been practised to-day strives to prevent the development of pneumothorax. To a less degree is there danger of pneumothorax in empyema operations, but the opening of a pulmonary abscess may be a very serious procedure if the parietal and visceral pleuræ are not adherent to each other. The operation for suture of the heart is very much less dangerous on account of the heart lesion than because of the pneumothorax, which is caused either by the injury or by the operative manipulations. Most of the fatal results in heart suture have been attributed to this complication. Still more difficult are operative procedures upon the œsophagus. No matter from what side the thoracic portion of the œsophagus is approached, the opening of the pleural cavity cannot be avoided. For this reason thoracic œsophagotomy, both in man and animals, has been inevitably fatal.

Attempts have been made to avoid the dangers of the pneumothorax by producing artificial respiration through an intubation tube. This method, however, is not unattended with dangers.

It was in October of 1903 that Mikulicz[2] assigned to Sauerbruch the task of surmounting these difficulties, and as a result of Sauerbruch's labors a pneumatic chamber was constructed in which a constant negative pressure could be maintained. The chamber is airtight, covered with a glass top, and sufficiently large to contain an operating table and two seats for the operator and assistant. In one wall is a circular opening provided with a rubber cuff through which the animal's head projects. On another side is a ventilating apparatus, consisting of a valve and a suction pump run by an electric motor. The latter pumps twenty-eight litres of air in the minute, and the pressure is controlled by a mercury manometer. The ventilation is perfect, and Sauerbruch has remained for two hours in the chamber without experiencing any discomfort. After fastening the experiment animal to the table with the head projecting through the circular opening to the outside, the operator and assistant enter and close the chamber. The suction pump exhausts the air until a negative pressure of 10 mm. Hg. is attained. When the operation was begun it was found that the thorax could be opened on both sides, and that all of the ribs and sternum could be removed, leaving merely small stumps, without interfering with the normal respirations of the animals. Seventy-eight animals were operated upon in the chamber, not one of which was lost during the performance of the operation.

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[1] Deutsche med. Wochenschrift, 1904, No. 15.

[2] Archiv f. klin. Chirurgie, Bd. lxxiii., Heft 4.

Among the operations which may be rendered safer or possible by the use of the pneumatic chamber may be considered extensive resection of the ribs for tumors of the thoracic wall, operations for wounds of the diaphragm; perhaps operations for lesions of the vertebræ where it is desired to attack the anterior surface of the vertebræ, as, for example, in tuberculous spondylitis associated with compression myelitis. The whole field of surgery of the lung may be opened up to us by the introduction of this new appliance. The possibility of removing circumscribed sections of diseased tissue may be near realization. Sutures of the heart may be undertaken with much less concern, and it may even be possible to deliberately open the cavity of the heart for the correction of valvular lesions. The mediastinum may be opened for the removal of malignant tumors, and, above all, the thoracic portion of the œsophagus becomes accessible.

INFECTIOUS DISEASES, INCLUDING ACUTE RHEUMATISM, CROUPOUS PNEUMONIA, AND INFLUENZA.

BY ROBERT B. PREBLE, A.B., M.D.

THE work of the past year upon infectious diseases is a striking example of the tendency of men to concentrate their thoughts along certain lines to the almost complete exclusion of other things, and this too without any collusion. Some subjects which have previously received but little or only sporadic attention have been repeatedly discussed, while others which even so recently as last year were the subject of numerous contributions have been almost completely neglected. For example, the effects of certain acute infections upon the heart and circulatory apparatus, particularly the effects of typhoid, scarlet fever, diphtheria, and tuberculosis, have been carefully considered and important new facts have been outlined. Certain other diseases have been almost completely neglected. Tetanus, which last year was repeatedly considered, has been scarcely mentioned and no really important addition to our knowledge has been made. There is marked only a growing tendency to introduce the antitoxins into direct contact with the nervous tissue, either by intraneural or intraspinal injections.

The importance of insects of various sorts—flies, mosquitoes, and ticks—in the diffusion of the infectious diseases seems to be very generally accepted and practically nothing of importance has been added. The etiological relation of the trypanosoma to the sleeping sickness is now accepted as a fact, and its transmission through the bite of the tsetse-fly is admitted. Far more important, from our personal point of view, is the now practically universal acceptance of the work done by the Americans in Havana upon yellow fever. The importance of the *Stegomyia fasciata* in the diffusion of this disease has been accepted by both the French and German commissioners appointed by their respective governments to study this question. One occasionally hears a voice in protest of this position, but the evidence is now so strong that we may accept the question as settled, and because of the brilliant results obtained by the health authorities in many communities from work directed along this line, we need no longer fear this disease as an epidemic. The relation of the mosquito to malaria is now universally accepted and forms a basis for work which is greatly reducing the frequency of this disease in portions of the world where it has always caused a major portion of human ills.

No subject has been more frequently discussed during the year than tuberculosis, but no real advance in knowledge can be recorded. In fact, much of the discussion has consisted of assertion and denial. The unity and duality of the human and bovine tuberculosis are still argued, and each party presents evidence in favor of its opinion. No marked advance in therapy has been made, but appreciation of the importance of methods of prevention has grown and many fruitful efforts have been made to educate the general public to the important, the most important, part which it must take in stamping out this universal scourge. The confidence of the profession in the dietetic and hygienic treatment has grown, and their employment may be now characterized as universal.

Typhoid fever has been very generally discussed and certain of its complications, notably intestinal perforation, have been the subject of many extensive articles. Truer appreciation of the value of the Widal reaction is being gained from wider experience, and the Ficker and other modifications of the test, made with the idea of simplifying it and rendering it more adaptable to the practitioner who does not have easy access to a laboratory, have proven to be reliable. The great significance of the low leukocyte count in the early diagnosis of this disease is pointed out in several articles.

Pneumonia has received a great deal of attention, more than would be its share were it not for the growing importance of this disease. Its elevation to the top of the list of destructive infections has to a certain degree concentrated attention upon it. Numerous contributions have been made to our knowledge of its complications, and the profession is beginning to more fully realize the fact that the pneumococcus is capable of causing many other clinical pictures than that of the classical pneumonia. It is greatly to be regretted that no actual progress has been made toward its prevention or more successful treatment. Some new drugs have been added to the already long list of specifics, which do not, however, stand the test. Potassium iodide, which years ago had its day, has reappeared as a candidate, but there seems no reason for the hope that it will prove any more efficient now than it did years ago when Semmola and Ferrara advocated it. In a general way the articles upon treatment have been more sane. There is an encouraging effort made to treat the patient rather than the disease, to intelligently individualize and to assume an attitude of "watchful expectancy," ready to help when help can be given, and to leave the patient alone when the value of our efforts is questionable. A number of the articles insist strongly upon the point of securing for the patient proper rest. The necessity of this seems too obvious for discussion, and yet that it has been so frequently mentioned of late indicates that others, like myself, have found frequent reason for rescuing the patient from the too active attention of the doctor and nurse.

The evidence in favor of the infectious nature of acute articular rheumatism increases, and it becomes more and more probable that the micrococcus of Triboulet and Wasserman is the actual cause of this disease. The work of Walker and Ryffel, of which rather complete details were given in the last number of PROGRESSIVE MEDICINE, has been in part confirmed. Curiously enough this work has received but little attention in America and almost nothing has been done in this country in the way of study of this disease. This is certainly not from lack of material, and it is to be hoped that the coming year will bring forward more work upon the subject.

During the past year measles, one of the most important although not one of the most fatal of the infectious diseases of children, has scarcely been mentioned. It was pointed out last year that this disease was not receiving the attention it deserves, and this year has shown no increase in its study.

Epidemic meningitis has not been common during the year except in New York, but there has appeared several articles on the treatment which promise much and are along new lines, namely, the direct application of antiseptics to the spinal canal.

Serum Diagnosis of Infections increases in importance and has been well considered by Rosenberger,[1] who made an extensive review of the literature relating to this subject. Those who are interested in the history of this most important diagnostic aid and in the evolution of the technique are referred to the whole article. We shall include here only a summary of the results.

TYPHOID FEVER. The agglutinating reaction may be wanting throughout the entire course of the disease, and as this may be due to too high dilution, low dilutions should be tried. Only in a minority of the cases does the reaction appear during the first week; oftenest it is in the second week, but it may be delayed even longer. Libman obtained a positive reaction in 127 of 165 cases of typhoid, and holds that in making the test dilutions 1:20 and 1:50 should be employed. Cabot collated 5978 cases of typhoid in which 97.2 per cent. gave the reaction, while in 5668 control cases only 5 per cent. gave it. Gwyn and Block found it in 144 of 151 cases; Stengel and Kneass in 2283 of 2392 cases.

Adams found it in 50 of 70 cases, and once as early as the third day. Billings, in 1908 blood examinations of suspected typhoid, obtained the reaction in 304, and 111 cases were considered to be typhoid, although there was no Widal reaction. In 131 in which the reaction was doubtful and in 1362 in which it was negative, the cases proved not to be typhoid. The persistence of the reaction has been studied by Browne and Crompton. They state that Widal found 11 of 40 cases showing the reaction long after convalescence. One reacted eight and a half years after with a dilution of 1:18,000. They examined 68 cases from one to forty-eight months after typhoid, and only 3 gave the reaction in dilutions of 1:20 and 1:50—a marked difference from the results recorded by Widal. Stern and Klower obtained a positive Widal in 25 of 100 persons ill with other diseases than typhoid, but in only 3 of these was the dilution over 1:20 and none over 1:40.

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[1] American Medicine, 1904, i., 621.

PNEUMOCOCCUS. Rosenow obtained agglutination of the pneumococcus in 77 of 83 cases of pneumonia. The power of agglutination appears early and remains to the onset of the crisis. After the crisis it shows a rapid diminution. It has been suggested that this reaction might be employed as a diagnostic aid in obscure cases of pneumonia. This peculiarity of the serum was employed by Dieulafoy and other French writers for this very purpose some years ago.

TUBERCULOSIS. The agglutination of the tubercle bacilli as an aid to diagnosis was discussed in the last article on infectious diseases, and Rosenberger in his article adds nothing new.

DYSENTERY. Wollstein found the Shiga bacillus in 39 out of 114 cases of summer diarrhœa in infants. The organism reacted in 21 cases to Flexner's Manila serum in dilutions of 1:50 up to 1:3000, while the Shiga serum gave agglutination up to 1:200. The reaction was uncertain during the first week, and may be absent for two weeks. The test is therefore useless for early diagnosis. Rosenthal in 30 cases found that the reaction could not be expected during the first weeks.

Duval and Bassett in 43 cases of summer diarrhœa isolated the dysentery bacillus, and this organism was agglutinated by the serum of the patients from whom it was obtained.

Park and Dunham obtained positive agglutinations in 12 of 22 cases. Pilsbury draws the following conclusions from a study of 114 cases of disease other than dysentery: 1. That the serum of non-dysenteric adult patients does agglutinate the Shiga and acid type (Flexner) bacilli frequently in dilutions of 1:20 and occasionally in a dilution as high as 1:100. 2. That this agglutinating power is wanting in the blood of non-dysenteric young infants, rarely being present even in a 1:10 dilution. 3. That there are certain differences in agglutinating capability between the Shiga and acid type bacilli, the former clumping more readily than the latter. 4. That a decided and prompt reaction, under two hours, with bacillus dysenteriæ in dilutions of 1:20 or higher in young subjects (under one year) and 1:50 or higher in older persons, who have not recently suffered from chronic or subacute intestinal disease, is probably pathognomonic of acute epidemic dysentery.

PARATYPHOID. The serum of some 42 cases of paratyphoid have been tested by various authors in regard to the agglutination of the paratyphoid bacillus and in 40 cases this reaction was positive.

COLON BACILLUS. Le Sage found the bacillus coli communis in 40 out of 50 cases of enteritis in infants, and the blood of all these cases caused its agglutination. Johnson and Goodall studied the agglutinating power of the blood over the colon bacillus in 25 cases of insanity, and found good agglutination in 4 of 5 cases of melancholia; 1 of 3 cases of general paresis; 1 of 2 cases of delusional insanity. Partial agglutination occurred in 6 of 11 cases of acute mania; 1 of 2 cases of delusional insanity; 1 of alcoholic insanity. No agglutination occurred in 5 cases of mania; 1 each of melancholia, puerperal insanity, and recurrent mania, and in 2 of general paralysis. The agglutination was, therefore, present in 60 per cent. of all cases.

Agglutination tests with varying results have been applied to the streptococci, staphylococci, plague bacillus, the micrococcus of Malta fever, influenza bacillus, gonococcus, bacillus icteroides, bacillus of leprosy, diphtheria bacillus, bacillus of tetanus, proteus vulgaris, oidium albicans, and cholera. In all of these agglutination has been observed, but in no case has the reaction been employed clinically.

Arteriosclerosis Due to Acute Infections. The subject of arteriosclerosis is not a new one, but it is only recently that the suggestion has been made that the acute infections might have some bearing upon the obscure etiology of this most important process. The relation of various chronic infections, notably syphilis, to it is generally admitted, but that an acute process like a typhoid fever may have a bearing upon a very chronic process like arteriosclerosis is a new thought.

The fact that other chronic processes have been referred to such briefly acting causes, for example, the suggestion of various French authors that scarlet fever is an important factor in the causation of hepatic cirrhosis, prepares one for this idea. The subject is carefully taken up by Thayer and Brush. These authors,[1] in a symposium upon arteriosclerosis before the Medical Section of the American Medical Association, contributed an article upon the relation of acute infections to arteriosclerosis. This is only one of a number of articles which have appeared during the year treating of the effects of the acute infections upon the circulatory apparatus, particularly upon the heart. In view of the immense importance of vascular changes, an importance which is by no means so generally appreciated as it should be, any article which throws light upon the causation of these changes deserves attention. The article contains a mass of detail which cannot be quoted here, but as a result of the study of 4000 patients entering consecutively the medical wards at Johns Hopkins these conclusions are drawn:

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[1] Journal of the American Medical Association, February 27, 1904.

1. The percentage of palpable radial arteries is materially higher among those individuals in whom there is a history of heavy physical labor and of the use of alcoholic stimulants than in the remaining cases. This percentage is appreciably higher in cases giving a history of heavy work.

2. The percentage of palpable radial arteries is higher among those cases presenting a history of severe infectious diseases than among those in which this history is absent, or among those in which a history of no causal factor could be obtained. The proportion is, however, far below that in the case of work or alcohol.

3. Rheumatism appears to be an acute infection, after which the percentage of palpable vessels is highest, and, next to rheumatism, typhoid fever.

There remains much work, both in the way of confirmation and extension, to be done along this line, and it is to be hoped that now that Thayer and Brush have given an impetus to the work, they and others will continue it to some definite and useful conclusion.

Dengue. Last year I had occasion to refer to an able piece of work by Graham, of Beyrouth, upon this disease, by which he appeared to have demonstrated the causal organism and its transmission by the bite of the culex fatigans. It is to be regretted that the year has brought no report upon this subject. Those who have an opportunity to study this disease, an important and serious one in many communities, should take up this work, for a confirmation of Graham's results opens up definite and effective means of stamping out the disease.

Diphtheria. One may infer, from the fact that there has been a marked decrease in the number of papers upon the use of the antitoxin in this disease, that most authors now regard this question as definitely settled, and that therefore it no longer warrants lengthy consideration. This is true, and yet it is important that reports of results should be added from time to time.

No one who has much to do with this disease can have failed to note the changing ideas of the layman in regard to it. During the preantitoxin days it was justly regarded as a most terrible disease, and one against which the medical profession was practically powerless. A diagnosis of diphtheria carried with it an implication of an unfavorable prognosis. The now nearly ten years of increasing employment of the antitoxin has shown the layman that the disease is conquered, and they are already beginning to forget that, left uncontrolled or carelessly handled, the disease will be as terrible as of old. Because they no longer see whole families devastated by it, they forget that such things ever happened, and they are getting into the same careless attitude in regard to diphtheria that so many now assume toward smallpox. It is conceivable that in the future we may have antiantitoxin organizations just as to-day we have antivaccination societies, and that they will employ the same illogicalities to prove their standpoint.

Immunization. Although the protective value of injections of the diphtheria antitoxin is now so well established and generally accepted that anything upon the subject may seem superfluous, the report of Zuppinger from the Rudolph Children's Hospital in Vienna seems worthy of some comment. In an early number of the current volume of the *Wiener klinische Wochenschrift* is a report upon their first 1000 immunizations. Their cases were from the youngest sucklings up to fourteen years. At first they, as most others, omitted the immunization of very young babies, but, like all others, came to include them. At first doses of 300 to 500 units were employed, but now for several years only 200 units have been used without any appreciable change in the results. They sound a warning against the use of such small doses as 50 units in very small children. In view of the perfect harmlessness of the antitoxin there can be no excuse for using such a small dose as 50 units, and personally I believe such doses useless. In the 1000 children immunized only 18 were sick during the first three to four weeks. Of these 18, 4 were taken sick the first day after the immunization, 4 the second, and 3 the third—*i. e.*, 11 were taken sick so shortly that it is reasonable to suppose that they were already infected at the time the injection was made. This means that the immunization fails in but 0.7 per cent. Of these 7 cases 1 was taken sick on the fourth, 2 on the ninth, 2 on the twelfth, 1 on the sixteenth, and 1 on the twenty-first day. In all the 18 cases the diphtheria ran a very mild course.

Of the 982 children which did not become sick within four weeks after the immunization, 9 showed a diphtheria later, 1 each after thirty, thirty-three, and thirty-five days, two and a half, three, three and a half, four, five, and eleven months.

In the hospital they followed one routine which appeals to me as an excellent practice. They give all children entering the hospital with measles or scarlet fever an immunizing dose of the diphtheria antitoxin. They do this because they have observed the frequency with which these diseases are followed by diphtheria. They draw attention also to the statement of Melenfeld that the mortality of scarlet fever fell 10 per cent. as soon as the immunization against diphtheria was made a routine practice.

Zuppinger quotes the reports of the value of the diphtheria immunization from different countries, giving the percentage of successes as follows: Holland, 98 to 99 per cent.; Italy, 98.2 per cent.; Hungary, 98.45 per cent.; Bosnia, 98.38 per cent.; France, 97.57 per cent.; Germany, 96 per cent.; Norway, 98 per cent.; Russia, 97.9 per cent.; England and the United States, 99.1 per cent. The conclusions and rules of conduct to be drawn from this report, including not only a local experience of 1000 cases, but also a report of the experience from practically all the civilized world, are so obvious that no comment seems necessary, and yet I personally see so many cases where, for one reason or another, the immunization of children exposed to diphtheria has been neglected, that I must add my voice in favor of the immunization as a routine measure to which there should be no exceptions. The commonest error is to omit the injection in the very young and in those who, rightly or wrongly, are thought to be weaklings. Yet it is just these cases which need the immunization most. They are least resistant and, once infected, have the least power of building their own antitoxin. The reason for omitting the injection in these cases is the erroneous idea that the injection has some injurious effect. This is altogether wrong, for the antitoxin is harmless, and this cannot be too fully dwelt upon. In a personal experience, covering now several thousand injections, I have never yet seen harm result, for I do not consider the urticaria from which some patients suffer a matter of any consequence whatever. The marvellous benefits of the antitoxin treatment and its practically universal success in preventing infection after exposure cannot be questioned by anyone who has had experience with it.

DIAGNOSIS. A paper by R. R. Campbell[1] upon the differential diagnosis between *pseudomembranous angina of syphilis* and *diphtheritic angina* attracts my attention because I have several times seen syphilitic throats mistaken for diphtheria. This is a far less serious mistake than the opposite one, of which Campbell quotes several examples. One cannot but agree fully with his general conclusion that these two conditions may so closely resemble each other that they can be differentiated by culture methods only, and that when any suspicion exists that the case is one of diphtheria the antitoxin should be used promptly while waiting the maturity of our culture tests.

McMahon[2] has an article upon the uncertainties of the diagnosis and the necessity of early and vigorous treatment of diphtheria which may well be quoted, not because it contains any new data, but because it places effective stress upon certain points:

1. Always examine the throat of a sick child, no matter what the symptoms are. To this might be added the caution to examine the nose

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[1] Journal of the American Medical Association, 1904, ii., 1549

[2] Canadian Practitioner and Review, 1904, p. 421.

also and make a culture in all cases of coryza which appear to be sicker than a simple nasal infection should make them. My observation is that a considerable number of the cases which do not receive antitoxin until the fourth or fifth day of their illness are cases in which the diphtheria began in the nose and later extended into the pharynx.

2. Do not trust to the old-fashioned, often wrongly spoken of as the simpler methods, because the diagnosis of diphtheria is doubtful. Whenever there is any reasonable grounds for suspecting diphtheria, use the antitoxin at once, and use enough. Too much can do no harm; too little will.

3. Immunize all children exposed to contagion.

4. Do not delay about using the antitoxin. "Do it now."

This points out the two most frequent mistakes in the treatment of this disease, delay and insufficient dosage. If the diagnosis of diphtheria is a reasonable suspicion, inject the patient at once, and if you are in doubt whether 2000 or 4000 units should be given, give the 4000.

Louis Fischer[1] reports a study of the condition of the upper air passages before and after *intubation of the larynx* for diphtheria. The article contains much that is important and interesting, but contains some teachings which appear to me to be wrong enough to warrant discussion. His methods are, I believe, the cause for the frequency with which he sees chronic stenosis of the larynx following the intubation and requiring the prolonged use of the tube. It was indeed this statement which struck me particularly, and it did so because my experience has been so different. In hunting for an explanation of this difference in experience one notes that Fischer usually employs from 2000 to 3000 units of antitoxin, and that the shortest time the tube is left in the larynx is four and a half days, while the average in 23 cases was nine and a half days. Here is the cause of Fischer's troubles, and if anything is a trouble it is a case of chronic stenosis requiring the prolonged use of the intubation tube. Experience leads me to the opinion that the primary dose of antitoxin in *all* cases of *laryngeal diphtheria* should be at least 10,000 units, and that this dose should be repeated every twelve to eighteen hours if the symptoms remain unchanged or get worse.

If the laryngeal stenosis is sufficient to cause marked dyspnœa the tube should be inserted. The insertion of the tube is far more frequently delayed too long than made too early. The tube should not be left longer than seventy-two hours, and I am becoming more and more inclined to the belief that forty-eight hours are nearer right. Once in a while the tube must be reinserted if removed thus early, but this is very exceptional. If, however, the tube is allowed to remain four days reinsertion is often required, and the longer the tube is left the more frequently trouble results.

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[1] Archives of Pediatrics, 1904, p. 101.

My idea is that within forty-eight to seventy-two hours after the administration of the antitoxin the exudate in the larynx is so softened that much of it can be coughed up, thus enlarging the opening in the larynx sufficiently to render the tube unnecessary. If the tube is left longer it changes the nutrition of tissues pressed upon by it sufficiently to make them liable to œdema or to cause actual necrosis, requiring for their relief the prolonged use of the tube.

Fischer also points out the fact that the indications for intubation in hospital and private practice are very different. Many cases which, in a hospital, where intubation can be done at any moment, might run their course without the operation, require immediate operation in a home. This is one of several reasons why cases of this character should, when possible, be transferred to a hospital. Another and equally cogent reason is that the removal of the tube may be as urgently and as suddenly demanded as the insertion. This can be done promptly in a hospital, while a fatal delay may be unavoidable if the case is kept at home.

HEART COMPLICATIONS. The importance of the cardiac complications and dangers in diphtheria has been for years fully appreciated by the profession, and while considerable space was given to this subject last year, both in its pathological and clinical aspects, the matter is of sufficient weight to quote rather fully an article by White and Smith.[1] They make a report upon a study of 946 cases of diphtheria treated at the Boston City Hospital, South Department, during one year. While including some other data of interest, the main attention is given to the heart complications. The great bulk of the cases, 70 per cent. of them, were less than ten years old, and the influence of age upon mortality is clearly shown in the following table:

	Cases.	Deaths.	Per cent.
1 year and under	57	19	33
1 to 5 years	331	43	13
5 to 10 years	248	20	8
10 to 16 years	109	6	5
Over 16 years	201	6	3

About one-half of the 132 fatal cases died of bronchopneumonia, usually following intubation or tracheotomy; about one-fourth died of heart complications, and the majority of the remaining quarter died of early severe toxæmia, a few of asphyxia or late paralysis. At least two-thirds of the severe and fatal cases averaged four, five, or more days without treatment with antitoxin.

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[1] Boston Medical and Surgical Journal, 1904, p. 433

Physical signs of cardiac disturbance, such as murmurs, rapid and irregular pulse, were common, but symptoms such as dyspnœa, dropsy, cyanosis were unusual. The relation of maximum pulse rate and mortality is shown in the following table:

Pulse rate.	Cases.	Deaths.	Per cent.
100 or under	127	4	3
100 to 120	114	11	9
120 to 140	378	19	5
140 to 160	226	33	14
Over 160	96	49	50

About 65 per cent. of the cases had a maximum pulse rate of less than 140 and showed a mortality rate of 5 per cent. In estimating the prognostic significance of the maximum pulse rate, due allowance must be made for the age of the individual.

IRREGULARITY OF THE PULSE. This was noted in nearly 60 per cent. of the cases, but was probably present at some time in a larger number. In most cases it appeared one to two weeks after entrance, and in about 35 per cent. of the cases persisted at the time of discharge. In some cases there were periods of varying length during which the pulse was alternatingly regular and irregular, others in which the pulse was constantly irregular. With improvement in the condition of the patient the periods of regularity became longer, the pulse often being irregular only under the influence of excitement or exertion. Patients between the ages of five and sixteen more frequently showed an irregular pulse than either those younger or older. Irregular rhythm was most frequently observed in severe and fatal cases, but Romberg's statement, that an irregular pulse is in general a sign of great weakness and approaching death, is certainly not true.

One of the most surprising items in this report by White and Smith is the frequency with which cardiac murmurs were found, in no less than 94 per cent. of the cases. All of the murmurs were systolic in time except those in a few cases of chronic heart disease. In 90 per cent. of these cases the murmur was found at the time of entrance, and developed within one or two weeks after entrance in the other 10 per cent. In 77 per cent. the murmurs were heard both at base and apex, 20 per cent. at apex alone, and 3 per cent. at base alone. The murmurs were loud, sometimes musical, frequently transmitted to the axilla, and usually associated with an accentuation of the second pulmonary sound. They were not affected by change in the position of the patient. The majority were associated with irregular heart action, and outlasted the fever. Cardiac enlargement was infrequent, except for the changes due to chronic heart disease. Autopsies have shown that actual endocarditis and pericarditis are extremely rare complications of diphtheria.

In view of the characters mentioned above, White and Smith do not consider the murmurs as functional, but as due for the most part to actual changes in the heart wall or papillary muscles. They regard them as due largely to relative mitral insufficiency resulting from changes in the heart muscle, or to changes in the innervation of the heart. The use of the term relative insufficiency seems to me unfortunate, for it implies sufficient dilatation of the ventricle to make the valves leak, while, as a matter of fact, the leakage is due not to dilatation, but to inco-ordination in the action of the papillary muscles. The term muscular insufficiency has been suggested for such cases, and it appears to be a better one.

The duration of the murmurs was usually several weeks at least, and in about 78 per cent. of the cases one or more murmurs were present at the date of discharge. The duration after leaving the hospital is unknown except in a few instances. Five or six cases were examined eight to ten months later, and each showed a murmur. Two of these showed also some cardiac enlargement with irregularity and weak first sound, probably a chronic myocarditis.

The first sign of cardiac disturbance was the murmur in 89 per cent. of the patients, a murmur with irregularity in 10 per cent., and irregularity only in 1 per cent. The small group of cases in which the heart symptoms were especially important are of three separate types, usually declaring themselves during or after the second week. The first and most serious type shows gallop rhythm, vomiting, epigastric pain and tenderness. The majority of these die after two or three weeks.

The second type shows a rapid, regular, or irregular pulse, easily affected by exertion, and lasts for weeks or months before recovery finally takes place.

The third type is rare, and its main feature is a bradycardia coming on at the end of the second or beginning of the third week. The pulse drops to 30 or even 20. The heart sounds are weak; the heart is moderately dilated. This was seen three times, and all the cases ended fatally.

Gallop rhythm is usually preceded by a period of rapid pulse, 140 or more, and the more sudden its appearance the more serious the outlook. This rhythm may continue for several days without much else except that the child is pale, restless, and without appetite.

Vomiting is apparently unattended by nausea and is accompanied by epigastric pain and tenderness. These persist until death or recovery.

The duration of life after the appearance of these symptoms is usually short, one to three days, but recovery is possible, especially in the cases which show no vomiting or abdominal tenderness.

Of the 36 cases in which serious cardiac symptoms appeared, two-thirds died. The effect of late treatment is shown by the fact that fourfifths of the fatal cases had no treatment until after the fourth day. All but two of these patients had at entrance a pulse of over 120 and several over 140.

Gallop rhythm was found in all these cases, appearing once on the sixth day, once on the twenty-seventh, and in all others from the ninth to the eighteenth day.

Late vomiting appeared in two-thirds of the cases and was present in all but four of the fatal cases.

Epigastric pain and tenderness is particularly bad, for nine-tenths of the patients showing it died.

The illness of those who recovered was prolonged six to twelve weeks, and all but one developed a multiple neuritis. Two-thirds left the hospital with an irregular heart and all but one showed murmurs at base and apex.

The treatment consists largely in rest in bed. In mild cases it is usually safe to let the patient out of bed at the end of two weeks, but the presence of markedly abnormal pulse rate, irregularity, cardiac dilatation, and gallop rhythm demand keeping the bed for weeks longer. All severe cases, and especially so when the antitoxin is given late, should be kept in bed for at least three weeks, even though none of the above-mentioned symptoms appear.

If symptoms appear strychnine is more useful than alcohol or digitalis given hypodermically if vomiting occurs. At the first appearance of vomiting rectal feeding should be begun and chips of ice only given by mouth. Cocaine in doses of $\frac{1}{12}$ grain by mouth may allay the vomiting; morphine in appropriate doses allays restlessness and pain.

Dysentery. It has become clear that the various forms of the bacillus dysenteriæ are very widely diffused throughout the world, and that many cases which do not present the clinical picture ordinarily suggested by the word dysentery are nevertheless the result of infection with this group of organisms. So far as one can conclude from the data at hand, both the Shiga and the Flexner variety are capable of exciting intestinal disturbances ranging from the mildest diarrhœa to the most severe bloody flux. The true nature of these cases can be determined by bacteriological methods only, including among them the agglutinating power of the blood serum. It is much to be regretted that the agglutinating phenomena do not appear early. This test is suitable for clinical use, but the cultural examination of the stools is too slow and laborious and requires too special a knowledge and equipment to be available to practitioners remote from the large centres. This will be a serious thing if the antidysenteric serum proves to be as specific as it is hoped, and unless other and more available methods of diagnosis are developed we will then be forced to employ the serum, even though the diagnosis is not complete, and be thankful that this serum is as harmless as the diphtheritic antitoxin.

The frequency with which the Shiga bacillus is found is shown by an article by La Fetra and Howland,[1] who report a series of 62 cases of intestinal infection by the Shiga bacillus in infants, studied rather from a clinical standpoint, although in each case the diagnosis is based upon a bacteriological study of the stools. The report is the more important because there has been no effort to select the severe cases, as has been done in other reports, but all cases of mild diarrhœa and intestinal infection as they came to the Vanderbilt Clinic were examined.

Two cases were seen in June, 33 in July, 18 in August, and 9 in September of 1903. The age and character of the illness is shown in the following table:

	Mild.	Moderate.	Severe.
Up to 3 months	5	1	2
3 to 6 "	7	4	2
6 to 9 "	3	9	3
9 to 12 "	0	5	3
Over 12 "	1	11	3

The older children are more apt to suffer from the severe attacks, probably because of the feeding. Of the 14 severe cases 1 was breast-fed, 5 were given condensed milk, 2 Straus' sterilized milk, 2 grocers' milk, 3 fairly clean bottled milk, and 1 not stated.

The symptoms had been present in the cases for from one day to three months when presented at the clinic, but in 40 of the cases they had lasted one week or less. Twenty-eight of the cases were under observation from one to three days, 12 from four to seven days, 10 from eight to fourteen days, 8 two weeks and over. The condition of nutrition when first seen is noted, and while some of the well-nourished children were severely ill, none of the emaciated were mildly ill. Sixteen cases were mild; by this is meant that the temperature did not rise above 100.5°, and there were not more than ten stools per day. The stools contained undigested food and mucus, but no blood.

Thirty-one cases were moderately severe, showing a temperature above 100.5°, with frequent passages containing mucus and sometimes a slight amount of blood.

Fourteen cases were severe, with marked constitutional symptoms, great depression, frequent mucous and often bloody stools. The temperature was usually high, but some of these cases were almost afebrile. Four cases are known to have been fatal; others may have died, but none were moribund when last seen.

There were 14 cases, exclusively breast-fed, that suffered from infection with the bacillus dysenteriæ.

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[1] New York Medical News, March, 1904.

The type of infection varies. In 42 the acid, Flexner Manila, or Harris organism was found; in 15 the alkaline or true Shiga type, and in 5 both types were found. There seemed to be no difference in the severity of the disease attributable to the type of infection.

TREATMENT. Milk of all sorts was immediately discontinued, and barley-water, broth, or some proprietary food, or, rarely, albumen-water was given in its place. Catharsis by calomel and castor oil was the invariable rule. When there was great tenesmus, rectal irrigation, with or without paregoric, was employed. Alcohol sponging was employed for temperature.

Ten cases, all severe, were given serum; 4 were of the acid type, and were given the Harris serum; 6 were of the alkaline type and the Shiga serum was employed; 10 to 20 c.c. of the serum were given. One case was moribund at the time of injection, 1 died three weeks later from marasmus and without a return of the diarrhœa, and in 4 other cases the serum apparently had no special effect.

The authors would emphasize the great prevalence of the dysentery organism in infantile diarrhœa (62 of 64 consecutive cases), that all types of diarrhœal disease are found among these cases, and that no less than 20 per cent. of the cases were breast-fed.

One important fact brought out by this report is that breast-fed children are liable to this infection; not a new fact, but it certainly is a surprise that one-fifth of the cases of this infection occur among this group of children. One must wonder where these children acquire the infection, and the drinking-water is a source which naturally suggests itself. It seems clear that one must be as careful of the baby's drinking-water as one is of the water of adults.

Rotch has been far less successful in hunting for the Shiga bacillus in the stools of his cases of diarrhœa. He[1] has an article upon diarrhœa in infancy and childhood which includes much valuable material that does not belong under this section and is therefore omitted. The relation of acute diarrhœa to the dysentery bacillus was studied in 61 consecutive and unselected cases of diarrhœa, and 16 per cent. of them proved to be the result of infection with the bacillus dysenteriæ. The diarrhœa may be either of the fermentative or the ileocolitic type. In the 10 cases in which the organism was found it caused symptoms of fermental diarrhœa in 30 per cent. and those of ileocolitic in 70 per cent. Only 6 per cent. of the fermental diarrhœa cases proved to be due to this organism, but it caused 78 per cent. of the ileocolitic cases.

Why Rotch was so much less successful in demonstrating the Shiga bacillus than La Fetra and Howland is not clear, and the difference between the 16 per cent. of one and the 97 per cent. of the others demands additional work to explain it.

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[1] American Medicine, 1904, i., 737

Howland in the *Medical News*, March 5, 1904, makes a report upon the autopsies of children dying of intestinal infections in the New York Foundling Hospital, the Babies Hospital, and the Nursery and Child's Hospital. The Shiga bacillus was found in the great majority of the cases, sometimes in the feces, ante-mortem or post-mortem, and sometimes in the scrapings from the intestinal mucous membrane. In all cases the bacillus was of the acid or Flexner variety. Howland concludes that this bacillus is capable of causing a wide variety of pathological changes, and that a large percentage of cases dying from this form of infection show no profound structural changes. The evidence indicates that the primary necrotic changes are due to the action of the dysentery bacillus and that the subsequent ulceration is due to the action of various other organisms. All grades and types of diarrhœal disease, as distinguished by clinical and pathological findings, may result from the Shiga bacillus.

Reference has already been made to the agglutination of the dysentery bacillus, and it has been pointed out that, while this reaction is frequent and occurs even in high dilutions, it does not appear early, being uncertain during the first week and often absent during the second also.

Reports upon the therapeutic value of antidysenteric serum are still contradictory, some showing negative or indifferent results, others reporting success. The most extensive article is by Rosenthal.

ANTIDYSENTERIC SERUM. Rosenthal[1] reports upon the use of serum in all cases between June and October, 1903. Most of the cases are to be classed as severe, using as a basis (Filatow) thirty or more stools per day as the criterion of a severe case. The general mortality in the Moscow Hospital at the time was 50 to 75 per cent. The serum was employed in all cases with the exception of 10 mild ones. It was also omitted in a number of cases in whom the dysentery developed as a complication of some fatal illness. In all 157 cases were treated, 63 females and 94 males, ranging in age from ten to eighty years; 30 per cent. between ten and twenty, 50 per cent. between twenty and forty, and the rest from forty years up.

Only 40 were examined bacteriologically, and in all with positive results. About 15 per cent. of the cases entered during the first three days of the illness, about 50 per cent. in the second half of the first week, 25 per cent. in the second week, and the rest later. Cathartics and enemata were avoided and the only medication was valerian and coffee. The diet consisted of bouillon, milk, white bread, eggs, and a little meat.

The average dose of the serum was 20 to 40 c.c., but in the severe cases up to 140 c.c. were used. No ill effects were noted, but erythema, urticaria, and joint swelling occurred a few times. The serum was of such a strength that each c.c. contained 100 antitoxin units, determined in just the same way that the unit of the diphtheria antitoxin is. The effects were particularly striking when the serum was used in the first three days of the disease. In the majority of these cases the disease was controlled within one to two days; the blood and mucus disappeared, the pain and tenesmus stopped. The serum worked well, but not so rapidly when employed later. The patients were improved within eighteen to twenty hours, and within twenty-four hours more the stools were less frequent, the blood and mucus had disappeared, the pain and tenesmus were much lessened, and in the course of two or three days more the patient was well. The recovery was final, relapses being rare, being noted only twice in this series. Transition into a chronic dysentery was even less frequent.

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[1] Deutsche med. Wochenschrift, 1904, p. 691.

Among the 157 cases there were 8 deaths, and 3 of these occurred from other diseases (streptococcus angina, pneumonia, tuberculous meningitis), after the dysentery was cured. Deducting these cases we have a mortality of 4.5 per cent. Three of the fatal cases entered at the end of the first week and 4 at the end of the second week.

According to the health reports the mortality from dysentery in the Moscow hospitals for adults for the past ten years ranges from 17.5 per cent. to 12.2 per cent. During this period the mortality of other hospitals has averaged 10 per cent., and in the Alt-Catharinen-Spital, where these cases were treated, the mortality was 10 per cent. previous to the employment of the serum.

Rosenthal concludes that the serum has a beneficial action upon all the subjective and objective symptoms of the disease, and that when it is employed within the first three days the recovery is complete in within one or two days.

Epidemic Meningitis. During the past year there have been numerous articles upon this interesting disease. One of the most profitable is that of Berg,[1] of New York City. He publishes an interesting report upon the clinical and other features presented by an epidemic of cerebrospinal meningitis in New York City, where 563 deaths occurred from this disease between January 1 and June 4, 1904. The highest number of deaths (73) was in the week ending May 14th, and the four subsequent weeks showed a gradual decrease. Experience in other epidemics would lead one to hope that this marks the fading of the epidemic. The disease shows a marked tendency to attack the young, and something more than three-fifths of the deaths were in children under six years, but nevertheless the proportion of older children and adults dying in this epidemic is very much greater than in any other epidemic the statistics of which are known to Berg. Moreover, the cases in adults and older children were more severe.

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[1] Medical Record, 1904, p. 404.

In this, as in all recorded epidemics, there was noted a synchronous increase in the deaths from *pneumonia.* This fact is the more interesting because of the close morphological similarity between the diplococcus pneumoniæ and the diplococcus intracellularis meningitidis. These two organisms are now believed to be distinct by most bacteriologists, and the latter is regarded as the cause of most epidemics of meningitis, although the former is admitted to be the cause of some.

Personally I cannot but be impressed by certain facts which suggest a very close relationship, even possible identity, between these two organisms. The constancy with which epidemics of meningitis are accompanied by an increase in deaths from pneumonia, the frequency with which pneumonia and meningitis are found together, the sudden onset, the chills, the leukocytosis, the herpes common to both diseases, are all suggestive of some close relationship. The herpes is a thing to which especial attention should be called. This eruption is common in but three diseases: malaria, pneumococcus infections, and in epidemic meningitis. Malaria is so distinctly a disease of another sort that we need not here consider it. This leaves us two infective processes presenting many clinical differences, but having one striking symptom common to them both and rarely seen in other infections, the herpetic eruption. One swallow does not make a summer, but when two supposedly distinct diseases like pneumonia and epidemic meningitis are found to be due to organisms so closely alike as the pneumococcus and the meningococcus, and present in common and with great frequency one symptom like herpes, which is rarely seen in other infections, the temptation is strong to contrast the clinical evidences of these two organisms in favor of their identity with the bacteriological evidences of their distinctness, and personally I am more impressed by the clinical than by the bacteriological data.

Another point to which attention should be drawn is that herpes in epidemic meningitis is apparently not due to the localization of the organism in the meninges, for it is only in this form of meningitis that herpes is seen. It is very rare to see it in tuberculous or pyogenic meningitis. It is, however, common in pneumococcus meningitis.

Returning now to Berg's report, it is to be noted that he found a few instances of apparent contagion, something not previously recorded. He saw, for example, three children in one family, a mother and daughter, and knows of two other instances in which two members of the same family were taken with the same disease.

Nothing is known of the incubation period, and but little of the mode of spread. Many believe that the infection atrium is the nose, whence it spreads by the lymphatics to the dura and subarachnoid spaces. It is possible that infection spreads through the blood, although the organism has not been found in blood cultures.

The germ is often found in the nasal discharge of patients with the disease, and for this reason all handkerchiefs and towels should be carefully sterilized, and care taken to avoid the diffusion of the nasal secretions. The organism is very resistant to drying, and all rooms and all bedding used by the patients should be thoroughly fumigated.

Berg reviews both the constitutional and nervous symptoms of the disease, but attention here need be given to but three. These are the blood changes, consisting of a leukocytosis of 18,000 to 30,000, the increase being mainly in the polymorphonuclear form. The blood cultures so far made have not yielded satisfactory results, but it is to be hoped that they will be made properly and repeatedly whenever an opportunity presents itself. It will be surprising if the bacteria are not found as frequently as they are now found in pneumonia.

The lumbar puncture yields valuable signs. The bacteria are found in smears and by culture in 100 per cent. of the cases. Battencourt and Franca found them in all of 271 cases examined. Examination of the cells found shows them to be 90 per cent. polymorphonuclear and 10 per cent. mononuclear.

Berg has much confidence in Kernig's sign as evidence of involvement of the cord, and speaks of it as most useful and distinctive in both adults and children. A diminution of the Kernig sign has a favorable prognostic significance.

Treatment has not progressed as our knowledge of symptoms, etiology, and pathology has. Berg employs repeated lumbar puncture if the cerebrospinal fluid flows from the cannula in a continuous stream under tension. If it does not, the puncture does no good. Battencourt and Franca treated their cases by injections of a $\frac{1}{10}$ per cent. solution of lysol. Berg employs sodium iodide in 5 to 10 grain doses every three hours in a child over a year old, and 15 to 20 grains in an adult. He uses also mercurial ointment, 15 grains, twice daily, to the spine in adults. Ice-bags to head, neck, and spine, and baths at 80° F. for temperature above 103°. Care, cleanliness, a large and airy room, and attention to eyes and ears are also imperative.

Berg in speaking of the treatment mentions the fact that cases have been treated by intraspinal injections of lysol solution, but has not himself tried it. Manges and Nammack have both tried this method, and, while their experience is too limited to warrant any conclusions, the current methods of treatment are so futile that one is tempted to try anything which offers any reasonable chance of improvement. It is to be hoped that the coming year will bring many reports upon the employment of these injections, and that the result may be as favorable as those reported from Lisbon.

Manges[1] reports upon 3 cases of epidemic meningitis treated by intraspinal injections of *lysol* solution. He was led to try this partly by the generally appreciated uselessness of the current methods of treatment and partly by the favorable report by Seager, who saw 31 cases treated in Lisbon by this method. There were 13 deaths, 5 from dilatation of the cerebral ventricles, 2 from pulmonary tuberculosis, 1 from œdema of the glottis, 1 from purulent pneumonia, and 4 from the disease without complications. The 18 that recovered were completely cured. The method of treatment consists in withdrawing varying amounts, often as much as 50 c.c., of the cerebrospinal fluid. In some cases, those in which the fluid was very tenacious, normal saline solution was injected through one needle and allowed to escape through another. After this irrigation 3 to 9 c.c. in children and 12 to 15 c.c. of a $\frac{1}{10}$ per cent. solution of lysol was injected. The injections were repeated once daily till the fluid was clear.

Manges treated 3 cases, one due to the meningococcus, 1 to a virulent streptococcus, and the third to an organism which for some reason was not studied. All three of the cases made complete recoveries.

Nammacke[2] also has had a limited experience in the use of the lysol injections. He has employed them in 5 cases, 4 of which were due to the meningococcus and 1 to an organism which was probably staphylococcus. Only one of the cases recovered. Two of the cases caused by the meningococcus were associated with malignant endocarditis, generally considered to be a rare effect of this organism.

Malaria. This disease has been so thoroughly worked over that there seems but little left unknown, and unless the future opens up new lines of thought the coming years will see but few contributions. Most of the articles this year have been upon methods and efforts made toward the extermination of the mosquito. Municipalities and societies are working in many places upon these problems, and are meeting with a success which leads to the hope that the mosquito will cease to be a pest.

Krause appears as an advocate of the employment of differential counts of the white blood cells as a means of diagnosis, and believes them, while less certain than the demonstration of the plasmodium, to be easier in many cases. In making such counts it is not necessary to know the absolute number of leukocytes, only their relative proportions. Blood smears are made at the bedside, and when convenient they are fixed, stained, and counted. There are certain types of malaria in which prolonged and repeated search for the organisms ends in failure. In these cases the differential counts will prove a valuable help.

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[1] Medical News, May 14, 1904.

Medical Record, i., 1904, 910.

Krause,[1] of Memphis, makes a report upon the value of the differential count of the white blood cells in the diagnosis of malaria. This subject was considered in the last article upon malaria in PROGRESSIVE MEDICINE, and Delaney's conclusion that an increase in the proportion of the large mononuclear cells to or beyond 12 per cent. was highly suggestive of malaria was quoted. Krause concludes, from a study of some 200 blood spreads, that it is not so much the absolute increased percentage of large lymphocytes which is diagnostic of malarial infection as the relative increase over the small lymphocytes. Of 204 malarial cases the percentage of the various forms of white cells was found to average as follows: small lymphocytes, 14.8; large lymphocytes, 19.5; polymorphonuclear, 63.7; eosinophiles, 2.0.

Krause's results are much more convincing than Delaney's. The latter found the plasmodia in only 17 per cent. of his cases, while the very great majority of Krause's diagnoses of malaria were proven by the demonstration of the parasite. Krause further concludes from his work that:

1. In cases of malarial infection, without much fever and without quinine history, the polynuclears are markedly diminished and the large lymphocytes very much increased in proportion.
2. In the absence of an adenopathy, possibly also of influenza and measles, the above finding is positive evidence of present or very recent malarial infection.
3. During the rise of a malarial fever, or as a result of quinine therapy, the polynuclear leukocytes may reach 80 per cent., but in that event the large lymphocytes exceed in number the small ones.
4. In malarial hæmoglobinuria any of the various blood findings characteristic of malarial fever may be present in any stage, and there is no evidence now at hand to explain this.
5. Malarial and typhoid fevers can be more positively differentiated from fevers of sepsis, pneumonia, rheumatism, malignant tumors, etc., by the differential leukocyte count than by the hæmocytometer, and it can be done on dried films, away from the bedside.
6. Malarial infection makes a strong impress on the leukocytic relation, no matter with what other disease it is associated.
7. It is not safe to rule out typhoid fever when the malarial variation is found, but, as it calls for antimalarial medication, the therapeutic test may decide before a Widal reaction would appear.

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[1] Journal of the American Medical Association, 1904, ii., 1202.

8. In a gradually developing fever the absence of marked increase in the large lymphocytes or polynuclears during the first week justifies a preliminary diagnosis of typhoid fever.

In the discussion of this paper R. N. Willson, of Philadelphia, brings out a point which I do not recall having seen before in print, although I have been familiar with the fact ever since 1894, when malaria was common in Chicago. At that time it was noted that in certain cases most careful search failed to find the malarial parasite until after quinine was given. It is interesting to find this observation confirmed after the passage of years.

Measles. This disease has received somewhat more study than last year, but there is still no effort made, so far as one can judge from the literature, to discover the causal organism. Several of the important symptoms have received discussion. One of the most important, because of its early appearance, is the so-called Koplik spots.

KOPLIK SPOTS. These have been carefully studied by Müller.[1] Upon the basis of an epidemic of measles numbering 215 cases Müller makes a report upon the Koplik spots, the diazo reaction, and the course of the fever in this disease. Like practically every reporter so far on record (the exception being Aronheim, who found the Koplik spots but 9 times in 150 cases of measles), Müller found the Koplik spots an early and very constant symptom, finding them in 134 of 166 cases carefully examined —*i. e.*, in 81 per cent. of the cases. He had but 12 opportunities to examine cases from the very beginning, and in 7 of these found the spots at the time of the first elevation of temperature, and 4 times they appeared during the second or third day. Once they did not appear. Eight times the spots preceded by one-half to two days the initial rash, which Müller found on the hard palate in 143 of 166 cases—*i. e.*, 86 per cent. As Widowitz and Motta-Coco pointed out, the flecks are not peculiar to measles, for they occur also in rötheln, Müller finding them in 6 of 14 cases of this sort. The frequency of the Koplik spots is shown in the following table:

Slawyk	45	times in	52	cases.
Havas	16	"	16	"
Perkel, prodromal stage	32	"	33	"
Perkel, eruptive stage	67	"	92	"
Rolly	67	"	87	"
Lorand	329	"	348	"
Müller	134	"	166	"
	690	"	794	"

THE DIAZO REACTION was found 41 times in 42 cases examined at the height of the fever. In 10 cases examined before the initial fever 8 failed to give the reaction until after the eruption appeared and 2 showed it a half-day before.

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[1] Münchener med. Wochenschrift, 1904, p. 99.

TEMPERATURE. Müller concludes that most uncomplicated cases of measles show, during the initial catarrhal stage, a short and rapid rise of temperature, then an intermission of one to two days, and lastly a second sharp rise of temperature, which continues for about four days and then rapidly falls. Less often the temperature rises gradually, and still less frequently rises sharply without any warning.

The temperature course in measles is also described by Berg[1] as follows: During the exanthematic period the temperature rises toward night and declines about a degree toward morning. This lasts from two to five days. There is a sharp decline, sometimes to within a degree of normal, on the morning of the day when the skin eruption appears. With the appearance of the eruption the temperature rises rapidly and usually to a higher level than before. As the eruption spreads to the chest and the abdomen the evening temperature rises still higher. During the day the eruption becomes complete, the evening temperature is not quite so high, and during the night and following morning it falls abruptly to or nearly to the normal.

BLOOD CHANGES. The increasing attention which is being given to the changes in the white blood cells, not alone their absolute number, but also to the relative proportions assumed by the various type of cells, leads me to quote an article by Erber. He[2] makes a detailed report upon the blood findings in measles, *scarlet fever*, and *chickenpox*, from which the following may be quoted as containing that which is of the most value to the practitioners. In measles there is scarcely any change in the number of red blood corpuscles and the quantity of hæmoglobin undergoes but little reduction. In uncomplicated cases the leukocytes are not increased in number; on the contrary, during the period of eruption there is a very considerable fall in their number, and, inasmuch as this fall is mainly due to a decrease in the number of the small lymphocytes, the polymorphonuclear neutrophiles show a higher percentage count than normal—*i. e.*, an absolute leukopenia and a relative leukocytosis. At the height of the fever the eosinophiles disappear entirely.

In scarlet fever the red blood corpuscles gradually decrease in number during the course of the disease, and somewhat more rapidly there occurs a fall in the hæmoglobin content. There is a very considerable increase in the number of polymorphonuclear leukocytes, and, inasmuch as the lymphocytes remain practically normal in number, this increase is both absolute and relative. This is in contrast with measles, in which the increase is relative only. The eosinophile cells are practically unaltered.

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[1] Medical Record, 1904, ii., 1.

[2] Zeitschrift für Heilkunde, 1904, p. 274.

In varicella the blood picture is still different. Here the number of white cells is normal, but the proportions of the various forms are so altered that the mononuclear cells are more numerous than the polynuclear.

CONJUNCTIVITIS. The bacterial aspect of this symptom of measles has been studied during the year, and one fact which may prove to be of major importance was found, namely, that the bacterial content of the conjunctival sac was different in severe and fatal cases, the streptococcus being here much more frequent than in the milder cases. This suggests the possibility of this organism being often the cause of death in this disease, as it is in scarlet fever, and that it would be well, in families and in hospitals where these cases occur, to make routine examinations of the conjunctival and nasal secretions for the streptococcus, and separate cases in which it is found from the others. This is being done with benefit in the scarlet-fever wards, and the suggestion seems reasonable enough to warrant its trial in the case of measles.

This work is reported by Schottelius,[1] who made a study of the bacterial content of the conjunctival sac in 40 cases of measles and in 40 children dead of measles. In all circumstances the cultures were positive. The staphylococcus aureus was found 25 times in the living and 26 times in the dead. Much greater difference was found with the streptococcus, which was found 5 times in the 40 living and 20 times in the 40 dead.

OTITIS MEDIA. Another important complication of measles has been carefully described during the year. Otitis media, while frequently mentioned as a complication of most of the acute infectious diseases of childhood, is not often mentioned in connection with measles. The frequency with which this complication occurs varies in different epidemics, but that reported by Cioppi shows the highest percentage, about 50 per cent. The number of cases depends largely upon the care used in hunting for them. Nadeleczny[2] reports upon the ears in 100 cases of measles. He found that 59.5 per cent. of all the cases had acute inflammatory disease of the middle ear. This makes it one of the commonest of the complications of measles. It is also to be noted that this usually develops during the first two weeks and may appear even in the prodromal stage. It may, however, be delayed until the period of desquamation. The inflammation of the middle ear usually causes distinct subjective symptoms. It is oftenest a mild process, tending to spontaneous recovery, but it may go on to suppuration and mastoiditis.

Jessen[3] reports a case of acute *polymyositis* following measles, an unusual complication indeed, not so far reported.

Edens in the same article adds the report of a case of *polyneuritis* following measles. A number of nervous sequelæ are recorded in the literature upon measles: paralyses of both cerebral and spinal origin, pseudomultiple sclerosis, and tic. Morton and Monro have each reported a case of polyneuritis after measles and Edens adds a third. His case was a girl of sixteen, who after a severe but typical attack of measles developed the usual picture of a multiple neuritis. The nervous symptoms began on the twelfth day of the illness and consisted of pain, tenderness along the nerves, anæsthesia, and paralysis affecting all four extremities. The symptoms gradually disappeared and recovery was complete in a month.

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[1] Münchener med. Wochenschrift, 1904, p. 378.

[2] Jahrb. für Kinderheilkunde, 1904, p. 310.

[3] Berliner klin. Wochenschrift, 1904, p. 847.

Mumps. In view of the widespread opinion that parotitis is an insignificant affair, requiring practically no attention, an article by Tatschner[1] is of interest. The only complications of mumps which have received much attention are the genital and mammary metastases. These, however, are not the only ones; for one finds here and there reference to such complications as meningitis, cystitis, nephritis, keratitis, conjunctivitis, retinitis, neuritis, otitis, endocarditis, pericarditis.

Tatschner had the unusual opportunity of observing four cases of *endocarditis* developing in four children of the same family. The cases all occurred during the same epidemic of mumps. Not one of the cases was particularly severe and none presented during the course any cardiac symptoms. The heart lesions manifested themselves only after the passage of some months. In one of the children the lesion was found two months after the attack of mumps and the other three were found some two months later.

These cases were the only ones found in the epidemic which Tatschner studied, and show in the first place that mumps is quite capable of causing serious complications, and that patients recovering from this disease should be kept under observation for months.

Pneumonia. During the year there has been a very large amount of work done upon this disease, now generally recognized as one of the most important of the acute infectious diseases, if indeed it is not the most important to all living in temperate climates. The growing importance of pneumonia received recognition in the appointment by the New York City authorities of an able commission of clinicians and pathologists for a special study of this disease, and it is to be hoped that some good may come from the work, and that something may be devised to lessen or prevent its rapidly increasing frequency. Attention was drawn last year to the truly alarming increase of pneumonia, and the past year has shown no improvement in this regard. The year shows also an increasing tendency to regard the disease as contagious and to require the isolation of the cases from other patients. As I have already stated, this idea does not especially appeal to me, although I am familiar with the absolutely numerous but relatively rare example of such contagion. To these have been added an interesting hospital epidemic by Edsall and Ghriskey,[1] who utilize a small epidemic of pneumonia occurring in their hospital work as a text for an article upon the transmission of pneumonia and the methods by which it can be prevented. April 3, 1903, a patient died of pneumonia in bed No. 2 of a side ward in the Episcopal Hospital, and within the next eleven days two patients placed temporarily in this bed developed pneumonia and the pneumococci were found in the blood of a third. On the twelfth day a patient in a neighboring bed was found to have the pneumococci in the blood, although no symptoms resulted from them. The ward was then fumigated with formalin and no further cases occurred.

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[1] Wiener medizinische Wochenschrift, 1904, p. 1453.

Such instances as these, of which there are now a considerable number in the literature, are utilized as evidence of the contagiousness of pneumonia and as arguments for the isolation of such cases. The recommendations of various authors, that the sputum and other excreta of pneumonic patients should be destroyed and that attendants of pneumonic cases should avoid any unnecessary contact with them, are readily agreed in, but that the cases should be isolated appears to me to be unnecessary.

As to the contagiousness of pneumonia I am very doubtful, although I have seen and reported examples as striking as those reported by Edsall and Ghriskey. The reasons for doubt are that in view of the very great frequency of pneumonia instances of contagion should be of daily occurrence instead of being exceptional. In every hospital in the world many thousands of cases of pneumonia are treated yearly, and yet such experiences as the one referred to above are so very rare that they are seen by but few. The disease is being constantly treated in the home, and yet examples of multiple cases in the same house are very rare. No one of the other contagious diseases presents any such opportunities for argument. Even the most limited experience with measles, or scarlet fever, or diphtheria will furnish numerous instances of contagion, but an experience covering thousands of cases is required to find examples of what is apparently contagiousness of pneumonia.

Furthermore, numerous authors have in the past reported upon the large number of normal individuals who have in their respiratory passages the causal organism of this disease, and Dürck and others have shown the great frequency with which the same organism is found even in the deepest portions of the lungs of freshly slaughtered animals. To speak of contagion in connection with an organism so ubiquitous as the pneumococcus appears to me to be unnecessary, and to limit its diffusion by the destruction of the sputum of patients, as is done with tuberculous sputum, appears perfectly hopeless unless the sputum of all human and domestic animals (if they have any) is also destroyed.

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[1] Therapeutic Gazette, 1904, p. 147.

For the present at least I believe that the prophylaxis of pneumonia is a question of personal hygiene rather than one of isolation and fumigation. The profession and the general public have long believed in the influence of meteorological conditions in the causation of pneumonia. There is no aspect of the etiology of disease more difficult to discuss intelligently than just this one. It requires the possession of large masses of data, uninteresting in themselves, and patient and thoughtful consideration of them. Anders[1] has made such a compilation and during the year has published them in a very elaborate and laborious article upon the influence of meteorological conditions in the causation of lobar pneumonia. He reaches the following conclusions, some of which are in accord with former opinions; others are at variance with them:

1. Seasons exert a marked effect upon the prevalence of lobar pneumonia, the maximal mortality being observed during the winter and spring months.
2. Insular climates probably manifest the greatest rise in pneumonia mortality in winter, while that of continental climates coincides mainly with spring.
3. The mortality of the epidemic form of the disease is, to a less extent, influenced by the seasons, and may occur in the fourth and even third quarter of the year.
4. An apparently close relationship exists between periods of low temperature and the death rate from pneumonia.
5. The mortality rises and falls with the barometric pressure, the maximal level being reached during periods of highest pressure, and vice versa; that the barometric pressure, however, is governed by the temperature, being inversely as the latter, is to be recollected.
6. The average velocity of the winds and the death rate from this disease would appear to stand to one another in the relation of cause and effect (a provisional explanation of this fact being found in the controlling influence exerted by the winds upon temperature and barometric pressure).
7. The coincidence of existing low temperature, high barometric pressure, the direction and velocity of the winds, and the maximum mortality from pneumonia is so uniformly constant as to warrant serious consideration and suggest a close and direct relation between their combined influence and the progress of mortality from pneumonia.

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[1] American Medicine, 1904, p. 407.

8. The mean relative humidity of the atmosphere shows equally decided variability, during the period of abeyance in the prevalence and fatality of the disease, with that of the cold or annual pneumonic season.

9. The major influence exerted by the seasons, however, is probably not direct (*e. g.*, by a lowering of the bodily resistance due to low temperature, high barometric pressure, direction and velocity of the winds, etc.), but indirect, namely, by bringing about that effective element in the causation, concentration, and increased virulence of the specific poisons, in consequence of closed doors and windows and lack of free ventilation.

It would seem that of these conclusions reached by Anders the last is the most important, and so far as present knowledge goes contains the kernel of the matter. Fortunately this is the only influence under our control. The general temperature and direction of the wind are independent of us, but we certainly can avoid the overheating and underventilating of our living-rooms. Much in the way of prophylaxis can be accomplished in this way, far more than can be done by the isolation of the patients. Our individual resistance to infection can be increased by leading proper lives, by living and sleeping in cool, well-ventilated rooms, and by avoiding overeating, overdrinking, and overworking. If, in spite of a rational life, infection still takes place, the chances of successfully overcoming it are materially increased. These, in my opinion, are the things which we must teach the public, and upon them we must concentrate their attention and thought.

The futility of attempting to avoid exposure to the pneumococcus is made more obvious by some work reported by Dürck. The fact that the pneumococci are frequently present in the pharynx and nose of people who have never had pneumonia is now well established and generally known. Until lately, however, it has been held that organisms did not penetrate to the deeper portions of the lungs. Dürck has opposed this idea and claimed that even in the most remote parts of the lungs bacteria could be found. He[1] makes an additional contribution in support of his opinion that the lungs are not free from bacteria as is generally stated, but, like the gastrointestial tract, constantly harbor bacteria, both pathogenic and non-pathogenic, and, as in the intestinal tract, they are harmless until some aiding cause either increases their virulence or lessens the defences normally opposed to them. Among other organisms found in the lungs of healthy animals are the streptococcus, staphylococcus, pneumobacillus, and, most important, the pneumococcus. Fraenkel, in his recent work upon the *Spezielle Pathologie und Therapie der Lungenkrankheiten*, says: "The development of a pneumonia requires in the majority of cases some contributory cause. The pneumococcus is the true cause of the croupous pneumonia, but it excites the disease only when its virulence is so great that it can penetrate the natural defences simply because it enters the deeper air passages, or when, because the defence is feeble, the soil is already favorable for its development in the lungs."

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[1] Münchener med. Wochenschrift, 1904, p. 1137.

Of the various influences favoring the development of the pneumococcus Dürck has paid especial attention to exposure to cold both when overheated and when not, and believes that such exposure is important, an experimental observation in striking coincidence with the popular impression of cold as a factor in the causation of pneumonia.

Dürck reviews the studies made by others than himself as to the bacterial content of the normal lungs, with the following results:

Béco in the lungs of 15 healthy house animals found the pneumococcus twice. Boni in the lungs of 20 pigs found bacteria 14 times, including the pneumococcus, streptococcus, staphylococcus, and pneumobacillus. Quensel found bacteria in the lungs of all of 16 calves, 5 horses, 6 pigs, and in 11 of 15 sheep. W. Müller found the lungs sterile in but 5 of 22 rabbits examined.

The influence of cold has been studied by several, with these results: Lode exposed animals, which had been one-half to two-thirds shaved, to heat and then to cold and injected cultures of the pneumobacillus; 85 per cent. of animals thus treated died from pleurisy or pneumonia, while only 12 per cent. of animals injected, but not exposed to cold, died.

These studies would seem to prove that the lungs are not free from bacteria, and that cold is an important factor in the causation of pneumonia.

General conceptions of a disease can be gained only from large experience, larger than can possibly fall to one man, and each one's personal opportunities must, therefore, be enlarged by careful attention to reports of peculiar cases, and more particularly to reviews of long series of cases. The relative frequency and significance of individual symptoms, the guides which they furnish to a proper prognosis, and the indications which they furnish for treatment must all be ascertained in this way.

McCrae, Fyshe, and Ainley[1] published a review of 486 cases of acute lobar pneumonia, and of 100 autopsies observed in the Montreal General Hospital between January, 1895, and August, 1903, 23 per cent. of the cases entered during the months of February and March, and 31.6 per cent. during April and May. This shows over one-half of the cases during these four months, a slightly higher percentage than is usually found.

The influence of sex is seen in the fact that 71.6 per cent. of the cases were males.

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[1] American Medicine, 1904, i., 134.

The mortality from the whole series was 21.2 per cent., and was somewhat higher among the women, 25 per cent. as compared with 21 per cent. The influence of age both upon the occurrence of the disease and upon the mortality is shown in the following table:

Age.	Number of cases.	Percentage of cases.	Number of deaths.	Percentage of total deaths.	One patient died in every
1 to 3 years . . .	16	3.3	5	4.9	3
4 " 15 " . . .	67	13.9	5	4.9	13
16 " 22 " . . .	70	14.5	5	4.9	14
23 " 31 " . . .	98	20.3	19	18.4	5
32 " 41 " . . .	92	19.1	19	18.4	5
42 " 51 " . . .	84	17.4	29	28.1	3
52 " 61 " . . .	33	6.8	11	10.7	3
62 and over	22	4.5	10	9.7	2

Of the various factors usually considered as of contributory etiological influence the authors note particularly previous attacks of pneumonia, race, occupation, the use of alcohol, influenza, and catarrh. Previous attacks of pneumonia were noted somewhat less frequently than usual, only 12.4 per cent. Three patients had had three previous attacks, one had two, and one had one.

It is interesting to note that a considerable proportion of the patients, 16 per cent., were recent arrivals in Montreal, a great many of them being poorly nourished Europeans, chiefly Italians. Of 444 patients 28.4 per cent. were engaged in out-door work and 71.6 per cent. were in-door workers. If one-fifth of the population works out-doors, then this class of population is one and one-half times more liable to pneumonia than the in-door workers. If 1 in 10 is the employed, the out-door worker is three and a half times as liable.

Of 190 cases in which the records are explicit on the question of alcohol, 32 per cent. were alcoholics, 46 per cent. moderate users of alcohol, and 19 per cent. teetotalers.

Acute influenza preceded the disease in 5 cases and catarrh, defined as chronic inflammation of the upper air passages, was present in 20.3 per cent. of the cases.

The average length of time from entrance to discharge from the hospital in 351 cases was 27.5 days. Sixty per cent. of the cases ended by crisis, 28 per cent. by lysis, and in 12 per cent. the fall of temperature was atypical. Of 211 cases in which the precise time could be determined, crisis occurred after the lapse of 7.1 days.

The temperature in 17 per cent. of the cases ranged from 99° to 102°; in 52 per cent. it was from 102° to 104°, and in 31 per cent. it was over 104°.

Of the symptoms usually present at the onset of an acute pneumonia, cough was present in 100 per cent., pain in 92.1 per cent., chilly sensations in 70 per cent., vomiting in 35 per cent., and rigor in 6.1 per cent. The pain was never referred to a region other than the seat of disease.

Rusty sputum appeared in 44.9 per cent. of the cases. The only nervous symptoms which were common were headache, present in 42 per cent., and delirium, present in 35 per cent. Mania and convulsions were each noted eight times.

The influence of alcohol on the delirium was noted; 59.2 per cent. of the cases were in non-alcoholics. Of 62 heavy drinkers, 37 were delirious: of 92 moderate drinkers 27 were delirious.

The bowels were normal in 57 per cent., diarrhœic in 12 per cent., and constipated in 31 per cent.; jaundice was noted but 18 times; albumin was found in the urine in 22 per cent. and casts in 1.5 per cent., both together in 25.7 per cent.

Sweating, profuse enough to be noted and occurring independently of the crisis, was found in 32 per cent. Herpes was noted in 26.1 per cent. Leukocytosis of more than 7500 was found in 43 of 45 cases.

The distribution of the process was as follows: right lung only, 48 per cent.; left lung only, 30 per cent., both lungs 22 per cent. The mortality in the bilateral cases was 31 per cent., in the left-lung cases 15 per cent., and in the right-lung cases 21 per cent.

The cases were treated in various ways; some with hydrotherapy; expectorants were given in a third of the cases; medicinal analgesics in one-tenth; ice and heat in a fourth; stimulants in three-fourths. The complications noted were: pleuritis, 163; emphysema, 28; meningitis, 23; otitis media, 19; empyema, 18; acute endocarditis, 16; myocarditis, 14; acute pericarditis, 11; thrombosis, 4; peritonitis, 3.

Some of the data from the 100 autopsy reports are particularly interesting. It is clear that the extent of the pneumonia has great influence upon the outcome: thus, 4-lobe cases make 9 per cent. of the autopsy series and 1 per cent. of the clinical; 3 lobes make respectively 31 per cent. and 20 per cent.; 2-lobe cases make respectively 38 per cent. and 38 per cent.; 1-lobe cases make respectively 21 per cent. and 40 per cent. Twenty-three per cent. of the cases were in the stage of red hepatization and 55 per cent. in the gray stage. The authors lay stress upon the well-known but often-forgotten fact that these stages are not sharply separated from one another.

Of 60 cases in which the bacteriological examination was made, the pneumococci was present in 65 per cent., in 5 per cent. mixed with other organisms; 20 per cent. were mixed infections of other kinds, and the streptococcus was the main factor in 8 per cent.

It is noted also that the spleen was not usually enlarged in the pure pneumococcus cases.

This report, while bringing out little that is actually new, refreshes one's mind of things easily forgotten, and lays stress upon many important features. It appears to me to be a mistake to include in the report cases which were not due to the pneumococcus, for I believe that the inclusion of such cases has been the cause of much confusion in our conception of this disease, and that our idea of the progress and outcome of it would be clarified by rigidly excluding all other forms of pneumonia. If in the future some specific method of treatment is discovered, there will be good practical reasons for such careful exclusion, while to-day the reasons may seem rather theoretical. In contrast with these statistics from adult cases may be quoted a report from Morse concerning pneumonia in infants. Morse's[1] article is important because of the emphasis which it lays upon a number of clinical facts. In the first place, lobar pneumonia is by no means so rare a disease in infancy as is generally assumed; 50 of the 118 cases were in the first year and 68 in the second. The onset is less stormy than in most acute infections at this time of the year. Vomiting was the initial symptom in but 7 of 77 cases with complete histories; convulsion occurred but once and chill not at all. Sudden onset of fever was rarely noted. Cough was noted in 75 of the 77 cases.

The distribution differs somewhat from that seen in adults, for the left lower lobe is the lobe most often involved, 38 per cent. of the entire number. A single lobe was involved in 86 per cent. of the cases.

The fever lasted from four to eighteen days, but the most common duration was seven days. The average duration of the fever was eight and one-tenth days, but was somewhat shorter in cases under one year than in those from one to two years old.

In 84 per cent. of the cases the maximum temperature was between 103° and 106°. In 11 per cent. it was under 103°, and in 5 per cent. over 106°. The highest temperature was 107° in a fatal case. The temperature fell by crisis in 68.8 per cent. of the cases, but it is noted that the crisis was more frequent in cases during the second year than during the first.

The influence of pulse upon the mortality is interesting. There were 17 cases in which the pulse rate did not pass 140, with no death; 11 cases with a pulse between 140 and 150, with 5 deaths; 37 cases with pulse between 150 and 160, with 9 deaths; 23 cases with pulse between 160 and 170, with 5 deaths; 21 cases with pulse between 170 and 180, with 9 deaths, and 8 cases with pulse of from 180 to 200, with 2 deaths.

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[1] Archives of Pediatrics, September, 1904.

In 75 per cent. of the cases the respiratory rate was between 55 and 80. No case died in which the rate was below 55, and above that point the rate of respiration did not seem to have much effect; for example, 6 cases with maximum respirations between 60 and 65 show a mortality of 33 per cent., and 6 cases with maximum rate between 85 and 90 showed the same mortality.

Of the whole series 31 cases died, giving a mortality of 26.3 per cent. Eighteen of these cases were in the first year, giving a mortality of 36 per cent. The mortality in the second-year cases was 19 per cent. Particular attention is demanded by these figures, and they show clearly that while pneumonia may be mild in childhood it certainly is not so in infancy, and that the mortality varies inversely as the age.

Morse outlines the treatment employed as follows: None beyond nursing and regulation of the diet was given in 30 cases. Antipneumonic serum was given to 10, but without effect. Creosotal was used in 6 with no result. Brandy was given to 60 per cent. of the cases, and strychnine to 30 per cent. Aromatic spirits of ammonia were given to 12 patients, digitalis and caffeine each to 1 case. Phenacetin was used in 8 cases and lactophenin in 1. The temperature was, as a rule, but little affected by these drugs and they apparently did no harm.

Cold in various forms was used in 28 cases. Tub baths and sponge baths were generally badly borne. Fan baths, at a temperature of from 100° to 110°, were used in 14 cases. They were badly borne in 1 case, were disliked by another, and caused excitement in a third. Several of the infants seemed to enjoy them, and, with the exception noted, they were always well borne.

HERPES ZOSTER. I am glad to mention an article by Riehl[1] upon herpes zoster in croupous pneumonia, not because I agree with all of his conclusions, but because it draws renewed attention to a symptom, not of croupous pneumonia, but of infection with the diplococcus pneumoniæ, which is too often overlooked. This organism causes three symptoms of primary importance, irrespective of their localization, namely, sudden onset, usually with a chill, a leukocytosis, and herpes zoster. Riehl's observations are upon 481 cases of croupous pneumonia, among which there were 129 examples of herpes zoster—*i. e.*, 27 per cent. This percentage is considerably lower than that observed by Drasche, 40 per cent.; by Metzer, 43.2 per cent.; or by Smoler, 32 per cent. Riehl believes that his low figure is due to the fact that many of his cases entered only a day or two before or even after the crisis, so late that a herpes could entirely disappear. In my opinion even 43.2 per cent. is too low. It probably includes only the cases in which the herpetic eruption is distinct enough to force attention. When, as frequently happens, there is but one or two vesicles, and these hidden in the moustache or within the nostrils, no note will be made of them unless they are looked for. Ninety per cent. will be found nearer right than 27 per cent. Riehl found the age distribution as follows:

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[1] Münchener med. Wochenschrift, 1904, p. 1105.

14 to 20 years	36 cases of herpes.
20 to 30 "	55 " "
30 to 40 "	18 " "
40 to 50 "	6 " "
50 to 60 "	9 " "
60 to 70 "	4 " "
70 to 80 "	1 " "

In his conclusion he says that pneumonia in children and in the senile almost always run their course without herpes. This is very positively different from personal experience, for I have seen herpes many times in both the very young and the very old.

In 79 per cent. of Riehl's cases the eruption occurred upon the third to fifth day, but he saw cases also in which it appeared as early as the second and as late as the twenty-sixth day. This corresponds with the experience of others.

Seventy of the 481 cases of pneumonia died, and of these only 6 showed a herpes. Of the 16 cases between the ages of sixty and eighty, a period of great fatality from pneumonia, it is found that 90 per cent. of the fatal cases between twenty and sixty are without herpes. Riehl does not agree with Geissler's statement that a herpes upon the third day is an unfavorable prognostic sign, but does agree with Strümpell, who says: "We still hold to the opinion that herpes has a certain amount of prognostic significance. At least we are ever anew struck by the fact that the severest and most dangerous pneumonias show no or only slight herpetic eruption, while the most marked herpes usually occurs in the mild cases." I would warn against placing any reliance upon the herpes in estimating either the outcome or the probable duration of the disease.

In about 90 per cent. of Riehl's cases the vesicles appeared over the distribution of the second and third branches of the trigeminus nerve. In 42 per cent. the eruption was on the red or upon the skin of the upper lip. The next most common sites were the lower lip, the nose, and the angle of the mouth. The figures are as follows:

Upper lip	25
Upper and lower lips	24
Upper lip and angles of mouth	1
Upper lip and nose	7
Upper lip, lower lip, and nose	3
Upper lip, angles of mouth, and nose	2
Upper lip and chin	1
Both lips and chin	1

There is no constant relation between the side affected by the pneumonia and the side affected by the herpes.

Localization of the herpes elsewhere than over the second and third branches of the fifth nerve occur, but are exceptional. The forehead, conjunctiva, ears, tongue, neck, arms, body, legs, sacrum—all of these have been observed.

Riehl gives as the most probable explanation of the frequency of herpes in pneumonia that given originally by Gerhardt. Gerhardt held that the herpes was due to the rapid rise in temperature and the resultant rise in blood pressure, irritating the fibres of the trigeminus or sympathetic in their course through the bony canals by the suddenly widened bloodvessels.

Riehl is apparently not familiar with the work of Howard referred to in the last number of the PROGRESSIVE MEDICINE, in which it is shown that there are anatomical changes in the Gasserian ganglion in the cases of herpes over the fifth and in the spinal ganglion in cases in which the herpes appears over the trunk.

Herpetic eruptions have been observed in cases of pneumococcus, endocarditis, pharyngitis, meningitis, arthritis, peritonitis, and sepsis. They are significant not of croupous pneumonia, but of the pneumococcus infection.

ENDOCARDITIS. Horder and Garrod[1] report a case of pneumococcus ulcerative endocarditis in which the pneumococcus was demonstrated in cultures from the blood during life. The case was treated by antipneumococcus serum without effect. The patient was a man of twenty-six, who, about one month before entrance, had had pain in the left chest and cough. These symptoms passed away and later giddiness, cough, and shortness of breath appeared. At entrance he had a temperature of 102.2°, with an enlarged heart, systolic murmur at apex, and a to-and-fro murmur at the base. The temperature ran a very irregular course, with numerous rigors and sweats. Cultures taken from the blood showed pure cultures of pneumococci. The leukocytes ranged from 16,000 to 24,000. Temperature ranged from normal to 106°. Evidence of embolism of the right popliteal artery developed. Death occurred fourteen days after entrance. The autopsy showed a pneumococcus endocarditis, with infarcts in right popliteal artery and in the spleen.

I have[2] reviewed the cases of pneumococcus endocarditis reported to date and add 3 personal observations. The cases number 132. The 3 personal cases presented the usual clinical picture of an acute endocarditis, one preceding and the others following an acute pneumonia. In all the pneumococci were demonstrated clinically in the blood. Two

[1] Lancet, 1904, i. p. 1561.

[2] American Journal of Medical Sciences, November, 1904.

of the patients recovered, both with mitral lesions. The third case died and the diagnosis was confirmed by autopsy. The frequency with which pneumonia is complicated by endocarditis, as indicated by the compiled statistics, is about 1 per cent. of all cases and 5 per cent. of the fatal cases. In most of these cases the endocarditis is due to the pneumococcus, there being only a few instances in which other bacteria acted as the cause. It also becomes clear that this organism causes a much higher proportion of the cases of acute endocarditis than might be supposed, something like 25 per cent. of cases being due to it.

The pneumococcus may cause endocarditis of any intensity, the cases ranging from small excrescences to massive polypoid vegetations; ulceration and perforation of the valves is, however, less common than in the cases due to the staphylococcus or streptococcus. While this variation in intensity is seen, about three-fourths of the cases are of the type usually characterized as malignant. The endocarditis usually affects the left valves of the heart, but involvement of the tricuspid and pulmonary valves occurs about four times as often as it does with endocarditis in general. Why this should be is pure speculation, but it may easily be due to the fact that in this disease the right heart is forced to do an excessive amount of work and that the resulting strain upon the valves may render them more susceptible to infection. Another fact about the distribution of this form of endocarditis, which is of interest, is that the aortic valves are much more frequently involved than the mitral and that the pneumococcus attacks the basal valves about twice as often as do the other bacteria which commonly cause endocarditis. The reason for this is not clear, but it may be due in part at least to the fact that the great bulk of the cases are beyond thirty years of age; that is, in that portion of life when the aortic valves are liable to suffer from arterial changes. The influence of age is shown by the fact that while 58 per cent. of all cases of pneumonia occur during the first three decades, only 18 per cent. of the cases of complicating endocarditis are seen during the same period. The fourth, fifth, and sixth decades supply 35 per cent. of the cases of pneumonia and 70 per cent. of the cases of pneumococcus endocarditis. It is possible that changes in the aortic cusps, insufficient to cause any clinical signs, are enough to make it easy for the pneumococci to emplant themselves and cause an endocarditis. In the future all such cases should be examined to see whether or not the valves show any evidences of arteriosclerotic changes. Another interesting fact is that the pneumococcus endocarditis is relatively twice as common in women as in men, but no suggestion as to why this should be is made.

It has been repeatedly stated that infarcts are exceptional in the pneumococcus endocarditis, but as they are found in something like one-half of the cases that statement is obviously incorrect. The endocarditis may develop before, during, or after the pulmonary involvement, but it is also possible for infection of the endocardium to occur without there being at any time any involvement of the lungs.

The clinical picture does not differ from that due to any acute endocarditis, and the true nature of the process is suggested only by its association with pneumonia or by the demonstration of the causal organism in the blood.

There is usually but not always an elevation of temperature, which may follow without any interruption that of the pneumonia, but in a considerable number of the cases there is a short afebrile period, usually lasting but three or four days, intervening. The fever of the endocarditis may last from a few days up to months and it may assume any type, although it is oftenest very irregular and interrupted by chills repeated at irregular intervals.

Subjective symptoms referable to the heart are usually absent except in cases where there is an old heart lesion, in which case they are due to the old rather than to the fresh endocarditis. Physical signs are often lacking, death occurring so shortly that there is no time for them to develop. In such cases the diagnosis is impossible and the endocarditis is often found upon the autopsy table as an entire surprise. An endocarditis should always be suspected in a case of pneumonia which is followed by an irregular temperature not sufficiently accounted for by some other complication, such as an empyema. This is especially true if the patient is a woman and beyond thirty years of age.

The prognosis is extremely grave, not alone because of the endocarditis, but also because of the fact that in some 60 per cent. of the cases there is also a meningitis. So far the records show but one unquestionable recovery. It is probable, however, that recovery is more common than the published cases would lead one to suppose, for it is not an uncommon clinical experience to find well-marked valvular lesions in people who say that they have never had any infectious process other than a pneumonia.

The treatment does not differ from that of any other form of acute endocarditis, and consists mainly of absolute rest in bed, with good food and stimulation as required.

OTITIS MEDIA. Ward[1] draws attention to the occurrence of otitis media as a complication of pneumonia. This may appear either before, during, or subsequent to the pulmonary process, and is especially to be anticipated in cases which have in the past had trouble with the middle ear. In the great majority of the cases the pneumococcus—for it is usually this organism which excites the complication—passes up the Eustachian tube and excites suppuration, but it is possible, though difficult to prove, that the infection may take place through the blood. The otitis occurs more often in children than in adults, for, as Netter pointed out some years ago, the tendency in children is for the pneumococcus to migrate upward from the pharynx, while in adults the tendency is to migrate downward.

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[1] Medical News, April 16, 1904.

Another fact to which attention was drawn in the 1904 number of PROGRESSIVE MEDICINE is that pneumococcus otitis media may occur without there being at any time any changes in the lungs. The number of these cases is doubtless greater than is at present supposed, and the true frequency of them can be learned only by a systematic bacteriological examination of the pus in all cases. This complication is a serious one, not alone because of its ultimate effects upon the hearing, but because of the danger of extension from the middle ear to the meninges.

TREATMENT. An article by Thompson[1] upon the treatment of pneumonia contains so much of good sense that it deserves some comment. Much of it I am willing to assent to, particularly to his contention that there can be no fixed plan of treatment. Each case must be treated on its merits, and many of them are best treated by being left entirely alone. Thompson advocates the use of aconite during the first twenty-four to thirty-six hours in sthenic cases with full, bounding pulse and evidences of marked toxæmia, and does not approve of venesection. My personal opinion is that exactly the opposite is correct. So far as I have been able to see, the aconite is quite useless and venesection in properly selected cases is most useful.

The essential factor in the control of the vascular system is to maintain a proper balance between the heart and bloodvessels, and to do this requires now one drug and now another, and the dosage must be constantly varied according to the demands. Overstimulation is as bad as, and far more common than, understimulation.

The temperature requires far less attention than is commonly given to it. When the temperature reaches 103° a cool alcohol sponge at intervals is grateful to the patient and therefore beneficial, but no active measures are required unless the temperature reaches 105°, when the cold pack should be resorted to.

During the past two or three decades there has been a constant succession of remedies advanced as so-called "specifics" for pneumonia, but their very number is proof that their alleged value has not been recognized by the profession at large, and the literature of the subject affords instructive if not encouraging testimony of their futility. Thompson also expresses his conviction that the so-called abortive methods of treatment are failures, and with him most, I may say all, experienced observers agree. As to the use of alcohol, it is given far less generally than formerly, but is useful in patients with feeble, dicrotic pulse, dry tongue, and profound asthenia. Its use is indicated, even demanded, in alcoholic patients, and it is often given with benefit to others. Thompson disapproves of the routine use of cough mixtures, and with him I most heartily agree. They accomplish nothing, but disturb the stomach and interfere with the assimilation of food, stimulants, and medicine.

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[1] Journal of the American Medical Association, March 19, 1904.

Gastrointestinal disorders must be guarded against, both because any distention of the intestine mechanically hinders the breathing and there is also more or less intoxication from absorption. When tympanites develops, all milk should be excluded from the diet, being replaced by egg albumen, and various intestinal antiseptics should be used.

Delirium is best controlled by bromides, codeine, or trional. Thompson disapproves of the use of morphine, but, as it has often been useful to me and never harmful, I cannot agree with him.

Rather to my surprise he believes that oxygen is often of distinct service. I agree that if it is to be used it should not be withheld until the patient is in extremes, but a long experience in its use has led to the conviction that the most which can be said for it is that it is harmless. The patient will get all the oxygen he needs if placed in a cool, well-ventilated room, kept free from useless attendants and stoves and lights, which destroy the oxygen and vitiate the air. Hypodermoclysis he advocates and has found useful, while topical applications he finds of no benefit. With both propositions I am in full accord. The only local applications which are of benefit are the ice-bag and the hot-water bag. Sometimes one, sometimes the other, will lessen the pain. They do not, however, shorten or influence the course of the disease.

One other thing should be noted and accentuated, and that is the importance of rest and quiet. One nurse, never more than two, at a time is all that is required, and the other members of the family should be absolutely excluded. There should be several periods of two or three hours duration during the day in which the patient is left absolutely alone and surrounded by everything and every condition which will induce sleep. More than one patient, and this is true of other diseases as well as of pneumonia, has been killed by too much care. Make certain that they are given a chance to get the sleep they need. It will do them more good than all the drugs in the pharmacopœia.

Venesection. During the year a number of articles have appeared favoring venesection in the treatment of pneumonia, and it is to be hoped that they are making converts. The present attitude of the majority of the profession toward this therapeutic agent is as irrational as, though less harmful than, that of our forefathers. Never to bleed is as bad as to bleed always. A free bleeding in a robust individual, before consolidation has taken place, is most valuable, as it is later when the increasing size of the heart and the failing accentuation of the second pulmonary tone indicate that the heart is no longer able to do its work. In these later cases and in those which have developed a pulmonary œdema, venesection is useful, sometimes life-saving, but too much must not be expected of it.

ANTIPNEUMONIC SERUM. Anders[1] has compiled the reports upon the use of antipneumonic serum and finds that in spite of isolated enthusiastic reports the total of results is not encouraging. It is now thirteen years since Klemperer prepared an antipneumonic serum, and during that time a great amount of work has been done by numerous authors, especially by the Italians. A variety of serums have been prepared in several ways, and while the laboratory experiments have given promise of good results the clinical tests have failed to show any value in the serums.

In this connection the statement of Welch[2] seems very pertinent. He affirms that the present stage of progress does not hold out any hope of a protective antitoxin owing to the low vitality of the pneumococcus in artificial inoculation, and, further, that there is absolutely nothing that can be termed specific in the disease.

Another difficulty lies in the fact that in many cases there is a mixed infection, thus complicating the conditions which an antitoxic serum must neutralize. I am of the opinion that this difficulty is easily overestimated and that many cases in which the bacteriologist finds postmortem a multiple infection are nevertheless clinically pure pneumococcus infections. That other organisms may cause clinical pictures closely resembling the pneumococcus pneumoniæ is true and will make the interpretation of results more difficult, but since they can in the great majority of instances be excluded by proper examinations of the blood during life, they should not have much bearing upon this question.

It seems to me that too much attention has been paid to the antitoxic side of this question and too little to the bactericidal aspect. Pneumonia is not a pure intoxication like diphtheria. It is a general infection, and a serum to be successful must not only neutralize the toxin, but must also destroy the bacteria. Anders compiles 535 cases which have received serum, with 85 deaths, a mortality of 18.3 per cent.

Rheumatism. During the year there has appeared some additional evidence in favor of the specificity of the micrococcus rheumaticus discovered by Triboulet. As was pointed out last year, this organism is strongly favored as the specific cause of acute articular rheumatism by an increasing number of observers, especially by French and English workers. On the other hand, a number of careful clinicians, notably those in connection with the Pribram Clinic in Prague and the Johns Hopkins Clinic in this country, have failed to find the organism. Personally I am impressed by the work done, but am still inclined to the opinion that rheumatism is a modified sepsis, "a faint mirror image of pyæmia," as Sahli puts it. No one who has access to large amounts of clinical material can have failed to see cases which show every gradation from the frankest kind of sepsis to the most typical acute articular rheumatism, and including in the series the various forms of primary purpura, the scurvy, morbus maculosus Werlhofii, purpura rheumatica, and purpura simplex. The dividing lines between these various forms of purpura, sepsis, and acute rheumatism are so slight that one cannot but suspect that they are merely varying manifestations of the same process. Such impressions, however, cannot weigh against direct evidence. It remains for the future to determine whether they are varying effects of one agent or are due to specific organisms.

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[1] Journal of American Medical Association, 1904, xi., 1777.

[2] Ibid., April, 1904.

Lewis and Longcope,[1] after reviewing the work of Wasserman, Triboulet, Poynton and Paine, Walker and Beaton, to which reference was made in the last article upon rheumatism in PROGRESSIVE MEDICINE, report a case of rheumatism, endocarditis, and chorea, in which they obtained from the blood during life a diplostreptococcus. This organism was moderately virulent for rabbits when injected intravenously, and gave rise to multiple arthritis, which is rarely fatal unless, as in one case, it is complicated by an acute vegetative endocarditis. The joint symptoms usually appear after an incubation period of from four to nine days.

Morphologically and biologically the organism cannot be certainly distinguished from the usual variety of streptococcus pyogenes. It grows fairly well in filtered twenty-four-hour bouillon cultures, but so, occasionally, do streptococci from other sources. Like Walker, they were able to obtain formic acid from the cultures on bouillon. The most striking peculiarity of this organism was the regularity with which it caused changes in the joints, heart, and serous membranes of the animals experimented on. The reporters believe that the organism found by them is the one described by Wasserman, Triboulet, and others, and their work must be looked upon as strengthening the claim that the micrococcus rheumaticus is the specific organism of rheumatism.

Another American article upon the etiology of rheumatism may be mentioned as an example of the persistence with which some minds cling to old ideas long after they have been almost universally abandoned. As already stated, there is still much room for argument over the question of the causal organisms of this disease; but that rheumatism is an infection, specific or otherwise, is now believed by most authorities.

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[1] American Journal of Medical Sciences, 1904, p. 603.

Winters'[1] article, in which he expresses the opinion that "rheumatism is caused by non-neutralized acid products of proteid metabolism," is a surprise. I think that most will agree that there is no sound basis for such an opinion, and that the sooner work along that line is abandoned and replaced by study of the infectious nature of the disease, the quicker the truth will be learned.

In the 1903 volume of PROGRESSIVE MEDICINE attention was drawn to some work by Menzer, in Halle, upon the etiology and treatment of rheumatism. Menzer is inclined to the opinion that the micro-organism of rheumatism is a streptococcus, probably not a specific one, which obtains entrance through the tonsils. He has prepared a serum from streptococci obtained from the throats of rheumatic patients, without, however, increasing their virulence by passage through animals. In his original communication in May of 1902 he could not report much in the way of results, but held that the serum caused a specific reaction with temperature, greater pain and swelling of the joints, and an occasional skin eruption. In August, 1904, he made a report of progress, paying especial attention to the following questions:

1. Does the treatment give a longer protection from relapse of the rheumatism?
2. In what way is the occurrence of valvular heart lesions affected?

He arranges his cases in different groups. The *first* consisted of 29 cases of the first attack of acute rheumatism, all beginning treatment within the first thirty days. The average duration in these cases was forty-six days. The *second* group consisted of 5 cases of the first attack of rheumatism, but entering later than the thirtieth day, on an average the forty-fourth day. These cases recovered in an average time of fifty-one days. The *third* group contains 13 cases which had had numerous attacks of rheumatism, and they recovered in an average period of fifty-three days. Of these 47 cases 43 were completely cured, 1 almost so, and 3 cured except for some slight stiffness.

The results were still better in the cases of chronic rheumatism; thus, in 9 cases which had lasted an average of five months 7 were cured, and 2 so much improved that they could return to work after treatment for an average of fifty-eight days. Of 2 other cases with polyneuritis, 1 was cured and the other improved Of 11 cases in which the disease had lasted for an average of two and a half years, in spite of the prolonged use of salicylates and other things, 5 were cured after one hundred and thirteen days of treatment, 2 were much improved, and 4 only partially so. Two cases of chorea, lasting about two and a half months, were treated and both recovered in two months.

So far as the permanence of the recovery is concerned not much can be said, for the longest period of observation is two years. Of the 47 acute cases 25 have been followed, and but 1 of them has had a relapse; of 11 chronic cases 9 have been well for a year, the other 2 could not be found.

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[1] Medical Record, 1904, 1., 41.

Menzer claims that the serum does not prevent an endocarditis, and rather favors recovery from it; but one cannot but question the accuracy of observation when it is stated that 23 of 47 showed an endocarditis, and that in only 2 of these did there remain a valvular lesion distinct enough to admit of positive diagnosis.

Menzer recognizes as contraindications to treatment pericarditis or pleurisy with large effusions, chronic endocarditis with stenosis of the orifices, and great debility as the result of prolonged chronic rheumatism. People of advanced years and those with arteriosclerosis should not receive the serum. Menzer draws these conclusions:

1. The serum may cause recovery or at least improvement in chronic cases.
2. Recovery from acute rheumatism is in general favored by the serum, and the chances of recovery from a complicating endocarditis are materially greater.
3. The dangers of relapse appear to be lessened, and even old cases remain for a longer time well or at least much better.

Sinnhuber in *Charité-Annalen,* 1904, makes a report upon the use of the Menzer serum in the Kraus Clinic, and in general agrees with Menzer's conclusions. He recommends the use of the serum, especially in subacute and chronic cases, but warns against its use in the acute cases and in cases of stenosis of the cardiac orifices. Menzer agrees with the latter limitations, but thinks that the severe acute cases should receive the serum.

This serum is comparable to the Moser scarlet-fever serum, being prepared in much the same way and exposed to the same objections. It cannot be looked upon as a specific serum with a specific action against some one organism, for not one but several allied bacteria are used in its preparation. One cannot oppose its use if the results are distinctly encouraging, but so far as they are reported by Menzer they are not particularly encouraging, and are indeed no improvement upon the results commonly obtained by the methods usually employed in the treatment of this disease.

Acute articular rheumatism is in general very responsive to the salicylates when they are properly given. So far as my personal observation goes, they are not usually given as they should be. They should be pushed to intoxication in the shortest possible time, and 5 to 6 drachms of the salicylate of soda or the aspirin, together with thrice that amount of the bicarbonate of soda, should be given within twelve hours. From then on the dosage should be 15 grains of each every four hours. Given in these large doses the effect is prompt. It is only rarely that a patient is found whose stomach will not stand this dosage, and the existence of a cardiac lesion is not a contraindication to their use. It must be admitted that the desired results are not always obtained, and it is possible that the Menzer serum may prove useful in such cases.

Among the unusual complications of rheumatism one must include *jaundice*. The amount of information usually included in the text-books upon this point is so limited that the article of Gaussel is quoted.

Gaussel[1] publishes a review of the literature of jaundice in connection with rheumatism. This is a rare complication of this extremely polymorphous disease, and yet its literature extends back to the time of Graves. Visceral manifestations of rheumatism are not uncommon, but they are usually confined to the serous membranes. The only mucous membrane frequently mentioned in connection with rheumatism is that of the tonsils. Pharyngitis and tonsillitis are so common that many authors regard them as the infection atria of acute articular rheumatism. Gastrointestinal catarrhs are also, but much less frequently, described, and there are scattered here and there reports of attacks of appendicitis in connection with rheumatism. Jaundice has been much less frequently noted, but has been described by Frank, Skoda, Widal, Pribram, and others. The pathogenesis of the icterus is obscure, as is that seen with pneumonia. Congestion of the liver, angiocholitis, duodenitis, alterations in the character of the bile, and the use of the salicylates are examples of the explanations offered.

The icterus may proceed, accompany, or follow the arthritis. The intensity varies; the feces may or may not be acholic, according as the ductus choledochus is obstructed or not. The duration varies, but in general it is not long.

The symptoms resulting from the jaundice itself do not differ from those of jaundice of any other cause, nor does its treatment differ.

Scarlet Fever. The work of Aaser, Millard, Lauder, and others is bringing out a fact of major importance in the care of scarlet fever, namely, that cases of scarlet fever may be a source of danger to each other. This idea appeals to one the more strongly because of the growing belief that while scarlet fever is not due to the streptococcus, a large part of the complications are. This naturally suggests the advisability of separating the complicated cases from the uncomplicated, a plan which is now being followed in several infectious hospitals.

Lauder has instituted in Southampton a new system of isolation and discharge of scarlet-fever patients. Mild and convalescent cases are segregated from the acute and complicated. As a result of this the number of complicated cases have been reduced. At the end of the third week cases free from complications are isolated in disinfected quarters, are bathed frequently, are given daily nasopharyngeal douches, and are discharged at the end of the fourth week, irrespective of the desquamation. Of 325 cases discharged during 1903, 33 were free from peeling and complications, and these caused no return cases; 204 were peeling, but without complications, and only 2 of them caused other cases; 88 were complicated, and 5 of these caused other cases. The 204 cases were returned to 180 houses containing 744 persons who had never had scarlet fever, and inasmuch as only 2 cases resulted one must conclude that the desquamation has but little infective power, if indeed it has any.

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[1] Archives générales de médecine, 1904, p. 1432.

Of the 5 complicated cases which caused others, all had had nasal or aural discharges and in some of them the discharge returned after leaving the hospital. All of these cases had ceased to peel before discharge from the hospital.

This experience is like that of Millard, who discharged 190 cases before the desquamation ceased, and only 5 of these caused other cases. Of these 5, 4 had a nasal discharge and 1 a running sore behind the ear.

The conclusion from this report would seem to be that it is not the scales which are infectious, but the discharges from the nose and ears of complicated cases. The separation of the mild and uncomplicated cases from the severe and complicated ones appeals to me as highly desirable, but I believe that until we know the infective agent of this most frightful disease and are certain that it is not attached to the scales, we had better make our mistakes on the safe side and isolate the scarlet-fever convalescents until desquamation has ceased.

The figures quoted above lead one to the same conclusion, for 33 cases which had finished desquamation caused no other cases, while infection did result, though in very small numbers, from uncomplicated cases still desquamating. I believe fully that the profession is remiss in this respect, dismissing cases from quarantine before the slow and prolonged scaling is finished. So little is sacrificed in carrying out this precaution and so much is risked by neglecting it, that it is certainly wrong to change the current plan until it is proven that the scales are not infectious.

Berg[1] has an interesting article upon the course of the fever in measles and scarlet fever, to which partial reference was made in the paragraphs upon measles. He objects to the customary division of these diseases into the three stages of invasion, eruption, and desquamation, and suggests that this be replaced by a division into the stages of eruption, defervescence, and desquamation. The period covered by the current term of invasion he would include in the eruptive stage under the name of enanthematic period. This has reference to the changes in the mucous membrane which precede the appearance of the cutaneous eruption, and includes the conjunctivitis, rhinitis, and the Koplik spots of measles, and the pharyngitis, tonsillitis, and the changes in the tongue of scarlet fever.

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[1] Medical Record, 1904, ii. p. 1.

Between the periods of defervescence and desquamation there are several days during which the skin looks quite normal in scarlet fever and nearly so in measles. The course of the temperature in measles has already been described. That in scarlet fever is much less complicated. During the development of the enanthemata and synchronous with the vomiting and the sore throat the temperature reaches a high degree, often the highest point attained at any time in the course. The exanthem appears promptly, often within six to eight hours, and generally within the first day or two. During the period while the eruption is spreading the temperature remains high, often maintaining its highest point for three or four days. The first slight decline is noticed when the eruption reaches the legs, and once begun the temperature continues to fall by lysis, reaching the normal in from five to eight days.

As has been previously noted, the year has seen an unusual number of articles upon the bearing of acute infections upon the causation of chronic cardiovascular changes and upon the acute cardiac changes of the same cause. One of the best of these is one in which Schmaltz[1] draws attention to the *cardiac changes in scarlet fever*, a subject which has heretofore received but little attention, strikingly little when compared with the amount of study given to the heart phenomena of diphtheria. This is largely because the clinical picture is not so striking. Formerly the symptoms were referred entirely to a complicating endocarditis, and Romberg was the first to draw attention to the fact that the heart muscle as well as the endocardium could be affected by this infection. Schmaltz leaves out of consideration all cases in which the cardiac complication is associated with either sepsis or nephritis, and bases his report upon 191 clinical cases. Among these no less than 35 per cent. showed abnormal symptoms from their circulatory apparatus. The frequency of this complication varies in different epidemics as do all other complications; for example, in 70 consecutive cases of which only 1 died, 38 showed cardiac disturbances.

Attention has been repeatedly drawn to the fact that marked tachycardia, 150 to 160 in children and 120 to 140 in adults, occurs commonly in the first febrile period of the disease, and that such tachycardia is not usually of serious moment. As a rule, the pulse rate falls rapidly to or often even below the normal when the temperature falls, a pulse of 55 being no unusual observation. Sometimes the fall is more gradual and often the pulse is very labile for some time, showing variation of 20 or more in the minute. In still other cases the pulse remains rapid even though the temperature becomes normal.

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[1] Münchener med. Wochenschrift, 1904, p. 1417.

In some cases the pulse later becomes rapid, and when this is extreme one can say that a disease of the heart certainly exists. Systolic murmurs are frequently heard over the heart and are usually not seriously considered, being regarded as mere febrile phenomena. They may appear as early as the first day and later either disappear or continue for a long time. More frequently they appear at the end of the first or during the second or third week. Frequently one finds also an accentuation of the second pulmonary tone. The cardiac dulness may remain unchanged, but often it is enlarged to the left, and less frequently to the right and upward. Romberg held that cardiac dilatation occurred only during the febrile period, but Schmaltz has seen it much more frequently late than early.

Arrhythmia is frequently noted, but may be absent even in severe cases. The subjective disturbances are minimal and consist only of slight palpitation, and may be moderate dyspnœa. The severe precordial distress, the pain, and vomiting prominent in the cardiac complication of diphtheria are conspicuously absent. There is no relation between the severity of the scarlet fever and the liability to cardiac complications, and also none between the so-called scarlet-fever rheumatism and these complications. In 23 cases of such rheumatism there were 10 of cardiac changes, and in nearly 70 with heart symptoms there were none with joint changes. The presence of some pre-existing heart lesion apparently has no influence, 17 of 26 such cases showing no evidences of cardiac involvement. Usually in the course of a longer or shorter time the murmur, the accentuation of the second pulmonary tone, and the cardiac dilatation disappear, but in 29 cases which left the hospital with cardiac symptoms, and which were examined after periods of varying length, 18 showed changes in the heart, and of these 16 showed the essential signs of mitral insufficiency—*i. e.*, an enlargement of the heart to the right, an accentuation of the second pulmonary tone, and a systolic murmur.

In 13 cases of Schmaltz and 20 collected at his request by Schmorl, only 3 showed an endocarditis. Schmaltz believes that the essential change in these cases is in the myocardium, that the leaking of the mitral valve is for a long time due to the myocarditis only, and that later, in some way which is not satisfactorily explained, the valves become altered.

The practical lesson from this report is to keep the scarlet-fever cases under careful observation for several weeks, and to note every, even minimal, disturbance. Schmaltz has found digitalis useless here, as he has with the heart of diphtheria, and recommends the local application of the ice-bag to the cardiac region.

A word may be inserted here in regard to the value of the *ice-bag* in combating the cardiac changes in all of the acute infections. These changes are far more frequent than is generally appreciated, and while their frequency is by no means the same in all the acute infections, they are common enough in them all. As a general thing, when alterations in the rhythm of the heart or marked tachycardia or bradycardia appear, resort is at once taken to the active cardiac stimulants, disregarding the fact that many of them would be better under the continuous use of the ice-bag applied to the præcordium. I find myself in full accord with Schmaltz's statement that in these cases digitalis is often useless and the ice-bag highly valuable.

Last year reference was made to the use of *urotropin* and preparations of that sort in the prevention of *nephritis* as a complication of scarlet fever. Personal experience has lent additional confidence, and the experience reported by others will lead to an extension of the practice. Buttersack[1] reports his personal experience with 10 cases of scarlet fever, occurring in an epidemic characterized by the great number of cases of complicating nephritis. He employed urotropin in all these and saw no nephritis. Ten cases is, to be sure, a small number, and this fact would be without significance were it not that they were part of an epidemic characterized as described. Last year considerable space was given to Escherich's report upon his experience with Moser's polyvalent *serum* in the treatment of scarlet fever. During the year no additional report has appeared from Vienna, but, in a lecture delivered by Escherich before the Chicago Medical Society this fall, he expressed increased confidence in its value, increasing experience making its claims on our attention stronger. It is to be hoped that additional data will appear soon, and still more is it to be hoped that provision will soon be made for a more general use of the serum. It seems that there are many difficulties in the way of its manufacture, and that many failures must be endured before success is attained. Even in Vienna Moser is having trouble in finding horses which yield a potent serum, and much time must be expended before it can be known whether a given horse is good for anything or not.

Some additional data is supplied by Bokav,[2] who reports his personal experience with the Moser polyvalent scarlet-fever serum. He selected 12 of the severest cases from 46, giving from 100 to 260 c.c. serum. After the injection the general condition improved within twenty-four hours, especially striking being the rapid disappearance of cerebral symptoms, unconsciousness or delirium being replaced by normal mental activity.

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[1] Deutsche Arch. klin. Med., lxxx. p. 356.

[2] Deutsche med. Wochenschrift, 1904, p. 6.

The rash faded rapidly. The temperature within twenty-four hours fell from 0.9° C. to 3.4° C., the average in the 10 cured cases being 2.1° C. In 5 cases the temperature rose for twenty-four hours to fall in the next twenty-four. In 3 cases the fall was really a crisis and the temperature did not go up again. No collapse occurred in these cases. Parallel with the decrease in the temperature was its fall in the pulse rate, with improvement in its quality.

The changes in the throat extended less and less rapidly.

Nephritis occurred in 2 cases, 1 severe and 1 mild; both recovered.

Arthralgia was noted in a few cases.

Otitis media occurred in a few cases, but was never severe. No injurious effects from serum was observed. The sudden introduction of so much animal serum had no bad effects, except in one instance when albuminuria occurred, and lasted but a very short time. Serum exanthemata was noted in 7 cases, occurring on the sixth, seventh, eighth, ninth, and sixteenth days, and once after four weeks.

Smallpox. Little new has been added to our knowledge of this disease. The discovery of a protozoan by Councilman as the possible cause of the disease has had no confirmation either by himself or by others. One must look with more than usual suspicion upon this suggestion, for it is in violation of our experience in other infections. All of the other diseases such as malaria, which are due to protozoa, require an intermediate host and are not contagious as smallpox certainly is. This objection to Councilman's suggestion, while purely a theoretical one, still appears to be a strong one. It holds equally well for the suggestion that scarlet fever is due to a protozoa.

An article by Mackenzie[1] is interesting and worthy of note because of the constantly recurring statement that vaccination has a deleterious influence upon the health. He carefully followed the subsequent history of 1000 vaccinated and of the same number of unvaccinated children, with the result tabled below:

	1000 Vaccinated.	1000 Unvaccinated.
Convulsions	2.83	10.67
Meningitis and hydrocephalus	9.96	10.78
Pneumonia and bronchitis	36.83	39.67
Marasmus and tabes mesentericus	5.66	46.78
Laryngitis and whooping-cough	5.66	7.19
Intestinal catarrh	16.16	35.59
Measles	4.25	
Heart disease	...	7.19
Erysipelas	1.46	

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[1] British Medical Journal, 1903, xi. p. 349.

This series is too short to reach any final conclusion, but it shows in figures, something perfectly well known to the profession, that vaccination does not lessen the health and resistance of the child to pay for the immunity to smallpox which it confers. It is probable that there is really no difference in the mortality from the various diseases quoted in the table among the vaccinated and the unvaccinated. The higher figures shown throughout in the table are probably due to the fact that there is a widespread objection to vaccinating children in poor condition. The objection is reasonable, but may easily be carried too far. If the child is actively ill the vaccination should be deferred, but if only a weakling vaccination should be performed. The truth of this was well shown during the past few months by a case in Chicago. The child in question was an invalid, seeing no one but the members of her own family, and confined constantly to the house. Because of this it was thought unnecessary to vaccinate the child. Although thus absolutely protected from all direct exposure, the child, nevertheless, acquired the disease, fortunately in a mild form.

Tetanus. Compared with last year practically nothing has appeared upon this disease. An occasional article recounting some single case, but nothing of extent or particular consequence. There is noted a growing tendency to apply whatever remedy is employed directly to the nervous tissues, either by means of intraspinal or by intraneural injections.

The *Journal of the American Association,* 1904, ii. p. 667, published its annual article upon the Fourth of July tetanus, and shows a most encouraging result from its campaign of education. In 1903 the report covered 415 cases resulting from these injuries, while this year the number is reduced to 105. This remarkable decrease is due to a variety of factors, in part to the lessened sale of the toy pistol and giant cracker, and in part to the better treatment of the wounds. The profession realizes now that these injuries, though apparently insignificant, really require very careful attention and a prophylactic dose of the tetanus antitoxin.

Tuberculosis. As always, this subject has been most extensively treated; an immense amount has been added to the already colossal literature, and yet it must be admitted that no material progress has been made. Many of the articles have been purely theoretical discussions of disputed points, without experimental or clinical basis for the opinions held.

Continued and increased effort has been made to educate the general public to the important part which it must take in the stamping out of this disease. So widely have the popular articles upon tuberculosis been circulated that any one who does not now know of the nature of the disease, the importance of the care of the sputum, the importance of early diagnosis, and the good results from proper treatment is deliberately ignorant. Confidence in the out-door life as a means of treatment is increasing, and the public, like the profession, is growing to more and more realize that migration to other climes is not so necessary as had been supposed. An increasing number of tent camps is being built, and all are reporting favorable results. One of the most successful has been established in the town of Ottawa under the care of Dr. Pettit and backed by the Illinois State Medical Society. The primary purpose of this colony is to demonstrate to the State authorities that tuberculosis is curable in Illinois, and thus lead to the establishment of public institutions for the care of these unfortunates. The results so far obtained have been most encouraging and it seems reasonable to hope that the evidence accumulated and accumulating, backed by the growing public interest and educated public opinion, will lead the Legislature to make the needed appropriations.

The cure of tuberculous patients in the vicinity of their own homes has other than mere economical advantages. All practitioners realize from their personal observations that it is not safe for one who has apparently completely recovered from a pulmonary tuberculosis to return from Colorado, California, or other health resorts to the place in which the infection was acquired. The possibility of a relighting of the old process is too great. In other words, the banishment from home is permanent. In contrast with this is the fact that cases which recover at home may safely remain there.

There have been a number of articles upon the measures which the State should adopt for the prevention and control of this disease. Too many of the profession have and still do object to the registration of tuberculous patients, and it must be admitted that there is some force to the points raised by them. All, however, in my opinion, are trivial as compared with the ultimate good which must come to the race by complete knowledge by the authorities of all sources of infections. Isolation of these cases is now admitted to be unnecessary, and life should be made as comfortable and easy for them as possible. They should be protected from all the annoyances which would come to them if the registration lists of tuberculous cases were made public. Such records should be for the health authorities only.

Herman Biggs[1] makes the following suggestions as to the requirements of administrative control of tuberculosis: (1) compulsory notification and registration of all cases; (2) the sputum examinations in all suspicious cases to facilitate early and accurate diagnosis; (3) educational measures, both for the profession and public, on the subject of tuberculosis by circulars, lectures, and the lay press; (4) visitation of consumptives in their homes for the purpose of educating them; (5) the disinfection of rooms which have been occupied by consumptives, and when necessary the renovation of the premises should be required of the landlord; (6) provision should be made for repeated visits, best by trained nurses, to cases in tenements; (7) suitable food should be supplied by the sanitary authorities to all so poor that they cannot provide for themselves; (8) the sanitary authorities should provide three classes of institutions: free dispensaries for ambulatory cases, hospitals for advanced cases, and sanatoria in favorably located country districts for incipient cases; (9) proper sanitary control of all institutions, hospitals, jails, asylums, and the like in which consumptives are confined; (10) enforce regulations forbidding spitting in public places.

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[1] Medical News, February 20, 1904.

There has been a considerable amount of discussion of the modes of infection in tuberculosis, and the following quotation from Lubarsch is made because it seems to be accurate and reasonable, and does not do violence to well-established clinical data by claiming too much for the intestinal tract as an infection atrium. Lubarsch[1] closes a very careful review of the literature upon the modes of infection with tuberculosis as follows:

1. Of all forms of tuberculosis the respiratory organs are much the commonest infection atrium.

2. The progrediente tuberculosis of the lungs occurs in the following ways:

(*a*) The inspired tubercle bacilli in the apical bronchi of the 3 to 7 group excite a tuberculous process which extends through the bronchi to other parts (type of Birch-Hirschfeld-Schmorl).

(*b*) They pass the bronchi into the alveoli, where they excite a tuberculous pneumonic process (type of Laennec-Koch).

(*c*) They pass from the bronchioles into the peribronchial tissue and there excite a tuberculous lymphangitis.

(*d*) They pass the alveoli or bronchi and in the intrapulmonary lymph follicles excite tuberculous foci.

(*e*) They pass the lungs to the gland at the hilus, there excite tuberculosis, and reach the lungs through the blood (type Ribbert), or break through into the bronchi (type Weigert-Hanau) and thus infect the lungs.

(*f*) Lungs infected through the blood from some old focus.

3. In addition to the inhalation tuberculosis is the infection by food, especially in children.

4. A progressive tuberculosis often follows, not the first infection, but starts from an old latent focus because some predisposing factor has come into play.

Another article by Biggs is quoted because it draws attention to a number of points which, though important, are easily overlooked or forgotten. The importance of house infection, which he points out, is one of the strongest reasons for the registration of tuberculous cases, for it is only by such notification of the health boards that they can practice the disinfection, as necessary with tuberculosis as it is with scarlet fever or diphtheria.

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[1] Fortschritte der Medizin, xxii. p. 715.

Biggs, in an article upon the reduction in the death rate from tuberculosis in children under fifteen years of age, expresses the opinion that the frequent recurrence of cases of tuberculosis in the same family in the same and succeeding generations is largely to be explained through house infection, although he is willing to concede a special susceptibility to tuberculous infection as a possible family characteristic.

Young children in the family of a tuberculous patient are more exposed than others. The infant is more constantly breathing the house air; the prevalent habit of kissing children, the practice of mothers tasting the food of children with the spoon used in feeding them, or through the nipple of the nursing bottle, bring opportunities for direct transfer of tubercle bacilli more important than is generally appreciated. When the children get to creeping around, the possibility of inhaling infected dust is given. The dangers of infection of little children outside of the house are not so great as they are later in life.

A table showing the death rate per 1000 population in five-year periods in the city of New York from tuberculous meningitis and pulmonary tuberculosis is condensed as follows: 1883–87, 0.67; 1888–92, 0.49; 1893–97, 0.42; 1898–1903, 0.34.

This shows a very encouraging decrease, due in Biggs' opinion, to the care now taken in New York.

During the year there have been two articles upon the interrelation of the heart and pulmonary tuberculosis, a subject which has been repeatedly discussed since the days of Rokitansky.

Norris[1] has published an interesting article upon the much-discussed relation of heart lesions to tuberculosis, and would seem to have completely destroyed what little was left of the Rokitansky teaching of the inhibitory influence of heart lesions upon tuberculosis. The details have no place here, but the conclusions are sufficiently important to warrant quotation:

1. In view of the frequency with which tuberculosis of the lungs has been found to be associated with valvular heart disease, we are forced to conclude that the latter exerts, if any, but very slight influence upon the former, either as an inhibitive or curative influence, even if satisfactory compensation is maintained. On considering the relative frequency of valvular lesions in general, mitral stenosis does not seem to be

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[1] American Journal of Medical Sciences, 1904, p. 649.

less often coincident with tuberculous disease of the lungs than other varieties of heart lesion.

2. It is doubtful whether smallness of the heart predisposes to pulmonary tuberculosis of the lungs to a greater degree than is explainable by the general systemic underdevelopment and lack of resistance which such individuals often exhibit. It is a fact, however, that small hearts, either as the result of wasting or hypoplasia, are commonly found at tuberculous autopsies, while large hearts are often encountered in uncomplicated cases.

3. Stenosis of the pulmonary orifice seems to favor development of tuberculosis of the lungs. A very large percentage of these cases die of the latter disease.

4. Arterial and endocardial thickening is a common result of tuberculous intoxication, but it is doubtful whether this process attains a sufficient degree to produce valvular incompetency, as claimed by Teissier.

5. Tuberculous endocarditis and myocarditis, particularly the former, occur with considerable rarity, but pericarditis, especially the chronic forms, very frequently owes its existence to the presence of the tubercle bacillus.

6. Tuberculosis of the aorta is also a finding of considerable rarity; the condition may result in the formation of an aneurysm.

7. The cardiac muscle undergoes various forms of degeneration in pulmonary tuberculosis, fatty and fibroid changes being very common, a fact which explains the signal failure of digitalis and certain other heart stimulants to benefit these cases.

8. Uncomplicated cases of pulmonary tuberculosis often exhibit such striking differences in resistive power and frequently evince such a remarkable tendency toward recovery, even in seemingly hopeless cases, that we should accept only the most absolute evidence as a proof that either the coincidence of another pathological condition or the administration of a special remedy has conferred a benefit upon the patient.

Sequer[1] contradicts the statement generally made that the heart in tuberculosis is atrophic. He examined 276 bodies of tuberculous patients in regard to the size of the heart and found it more or less atrophied in 84 cases, normal in 71, and hypertrophied in 115.

The atrophic hearts were found especially in the young, dying from chronic ulcerative tuberculosis. Tuberculous enteritis has an unquestionable influence in the causation of the atrophy.

Cardiac hypertrophy was found in cases showing emphysema, pulmonary sclerosis, or pleural synechiæ, all of which increase the pressure in the pulmonary artery.

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[1] Thèse de Paris, 1903

Clinically dilatation of the right heart is relatively frequent and manifests itself by important functional disturbances and by physical signs.

The blood pressure is always reduced in tuberculous cases, and this hypotension is an early and important sign of tuberculosis. The fall in pressure increases as the disease advances. The tachycardia and instability of the pulse in tuberculosis have been known for a long time.

Reference has already been made to the increasing confidence of the profession in the use of good air and good food and distrust of the use of drugs except for the relief of definite symptoms. Many, however, are experimenting with new drugs or with old ones used in new ways. The article by Jacobs, quoted below, appeals to one more strongly as a diagnostic than as a therapeutic resource. The intratracheal injections will certainly never become popular, either as a means of diagnosis or treatment, unless time proves them to have a most markedly beneficial effect.

Jacob[1] reports some experimental work and clinical experiments with what he calls *pulmonary infusions* in the diagnosis and treatment of pulmonary tuberculosis. He was led, by a consideration of the many changes and the great dilution to which any drug given by mouth, subcutaneously, or intravenously is subjected before it reached a diseased focus in the lungs, to experiments leading to a more direct introduction of drugs. Upon lower animals previously tracheotomized he found that he could inject large amounts of solutions directly into the bronchi without harm. He then experimented for six months upon five tuberculous cows. The animals were tracheotomized and from 300 to 600 c.c. of various solutions were used. The cows bore such injections twice weekly and some were greatly improved in health, and when they were slaughtered the pulmonary condition was found greatly improved. He used the following solutions: Betol (0.004 per cent.), creosote (0.1 per cent.), tuberculin (0.1 per cent.), methylene blue (0.1 per cent.), and pyoktanin (0.1 per cent.). The tuberculin and the creosote solutions gave the best results, although all except the pyoktanin caused some improvement. The injections caused some rise of temperature, 1.5° to 2° C., but proved to be safe.

When these infusions were given to patients the larynx was first thoroughly cocainized and then the trachea sprayed with a 2.5 per cent. solution of β-eucaine. The solution used for the infusion was tuberculin in water 20 to 30 c.c. The initial dose of tuberculin was $\frac{1}{2}$ mg. This was injected into the right or left bronchus as desired, through a long, soft-rubber tube 5 mm. thick and 45 cm. long. Animal experiments had shown that when the animal is standing the fluid flowed to the most dependent part. The same is, of course, true in man, and if it is desired that the fluid reach the upper part of the lung the patient should lie down.

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[1] Deutsche med. Wochenschrift, 1904, p. 945.

The infusions were given twice weekly and the amount of tuberculin was increased, but so slowly as to avoid any violent reaction, up to 3 to 5 mg.

Jacobs found also that if an individual had a pulmonary tuberculosis an elevation of temperature followed a pulmonary infusion of $\frac{1}{10}$ to $\frac{1}{12}$ the amount of tuberculin required to cause a reaction by hypodermic injection.

This work is interesting and will be carefully followed, and while Jacobs received encouragement from the results in the 5 cases reported, his observations are too few to warrant anything more than encouragement to continue.

Figari[1] makes a preliminary report upon the administration of *tubercle antitoxin* by mouth. He dried the coagula of the blood of immune animals (calf and horse) in part by heat and in part by sulphuric acid *in vacuo* and, pulverizing the resulting mass, gave it to guinea-pigs. In this way he was able to give the blood of these animals, after eighty-five days of the daily administration of 3 grains of the above material, an agglutinating power of 1: 25, while before the blood had no agglutinating power whatever. After this period he gave them a fatal dose of the tuberculin of Maragliano. Half of the animals lived thirty-six hours, while the control animals died in twelve to sixteen hours. The other animals survived.

He employed the same material in one clinical case for eighty days. The patient showed marked improvement, gaining 5.5 kilos (12 lbs.), and his blood, which at first showed an agglutinating power of 1: 10, at the end of the eighty days showed a power of 1: 50. The result is interesting not perhaps so much for its bearing upon tuberculosis as a confirmation of the experiments of others in giving various antitoxins by mouth and thus immunizing animals.

Typhoid. The important subject of the diagnosis of typhoid has received special attention during the year, and particular efforts have been made to facilitate the early diagnosis, not alone to enable one to begin appropriate treatment at the earliest possible moment, but also and particularly to introduce appropriate measures for the proper disinfection of the excreta, both urine and feces.

Last year attention was drawn to an address by Koch upon the importance of recognizing at the earliest possible moment not only those who are actively sick with typhoid, but also those in whose excreta the typhoid bacilli may be found. So far as danger to others is concerned, it does not make any difference whether the person has symptoms of typhoid or not, but Jürgens[2] draws attention again to the fact that typhoid bacilli may be present in the stools, although the individual is not and has not been sick, and that after typhoid fever the bacilli may remain in the intestinal tract for months and years. The demonstration of the typhoid bacilli in the stools can therefore be regarded only as an addition to the evidence favoring a diagnosis of typhoid, but it does not establish the diagnosis and is not to be seriously interpreted unless there is other evidence.

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[1] Berliner klin. Wochenschrift, 1904, p. 56.

[2] Deutsche med. Wochenschrift, 1904, p. 1233.

Much the same may be said of the Widal reaction. The significance of this reaction is not so single as was at first supposed. Great difficulties occur in the interpretation of the reaction at times, and each case must be studied separately.

Jürgens also lays stress upon the fact that it is not yet practicable for the practitioner to make etiological diagnosis at the bedside accurately enough to warrant attempts at separation of the typhoids into different groups. In the laboratory this may be possible, but not yet at the bedside. Even the employment of the Gruber-Widal reaction in practice has been greatly restricted by certain difficulties; so great, indeed, are these that this important test is scarcely employed outside of centres large enough to support bacteriological institutes. The employment of the dried blood according to the suggestion made by Johnson is the only thing which has made it possible to employ the Widal test even in large cities. It is therefore important that the method described in November of last year by Ficker receive mention. Ficker determined that before this test could be employed generally certain qualifications must be fulfilled: (1) something else than living culture of the typhoid bacilli must be used; (2) the specific agglutinable substance must be permanent; (3) it must show no disposition to spontaneous clearing; (4) the reaction must be visible to the naked eye; (5) the method must not require continuous observation over two hours; (6) the method must be modified so as not to require an incubator, and (7) the dilution of the suspected serum must be carried on in the same way in which it is done with the living typhoid bacilli.

Ficker was finally able to prepare such a test fluid containing dead typhoid bacilli. This fluid is permanent if kept cool and in the dark. It is supplied by Merck in pointed test-tubes, one containing 0.8 c.c. and the other 0.9 c.c. of the solution. To these 0.2 and 0.1 c.c. of serum diluted 1:10 with physiological salt solution are respectively added, and after shaking are set to one side and kept at room temperature. In ten to fourteen hours, if the reaction is present, the fluid is cleared and the agglutinable substances are collected in the bottom of the tube.

Since this article there have appeared a number of reports of trials of this modification, and all have agreed that it is a valuable and acurate addition. For example, Skutesky[1] in an extensive report upon the value of the Ficker modification of the Widal reaction and the reaction as originally obtained, concludes "that the Ficker method is entirely worthy of replacing the Widal reaction, and if the results are no better they are at least as certain. According to my experience no reaction speaks as strongly against a diagnosis of typhoid as a positive reaction does for it."

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[1] Zeitschrift für Heilkunde, Abt. F., 1904, p. 252.

Walter[1] reports the successful use of the Ficker modification of the Widal reaction, obtaining positive reaction in all of 12 cases of typhoid in dilutions ranging from 1:150 up to 1:1000. He regards the Ficker method of value to the general practitioner, making it possible for him to use the reaction with dead bacilli and without even a microscope.

Radzikowski[2] makes a favorable report upon the use of the Ficker modification of the Widal, making this test at the same time that he made the Widal as ordinarily conducted. In every case it proved to be reliable and he regards the Ficker method as a true addition to our diagnostic resources.

Our knowledge of the Widal reaction as ordinarily performed has been materially increased by Kreissl, who makes a report on the Widal reaction as observed during the past four years in the Rudolph Hospital in Vienna,[3] covering 381 tests on 306 cases. He employed a dilution of 1:30 in hanging drop and regards clumping after two hours in an incubator as positive. The reaction was positive in 166 cases; in 37 of these the diagnosis was confirmed by autopsy and in 121 by the clinical course.

In 8 cases showing a positive reaction the autopsy proved that typhoid did not exist. Five of these had had typhoid years before, but three of them had given no history and showed no traces of a previous typhoid. This confirms the observations of others that the Widal may occasionally be met in patients suffering from other disease and giving no history of an antecedent typhoid. It has been observed in septicæmia, meningitis, malaria, diabetes, scarlatina, pneumonia, influenza, endocarditis, miliary tuberculosis, tuberculosis of lungs, and tuberculous pleuritis.

Of the 140 cases in which the reaction was negative 132 by their later course confirmed the serum test, but in 8 cases the clinical course justified the diagnosis of typhoid in spite of the negative Widal. One of these died and the autopsy confirmed the diagnosis. This same observation has been made by a number of others.

Thus, in the 306 cases the Widal reaction failed to follow the rule 16 times, but from this should be deducted the 4 cases in which the Widal was positive, and a history of an old typhoid being present we have. (This gives a percentage of failure of but 3.9.)

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[1] Deutsche med. Wochenschrift, 1904, p. 1193.

[2] Wiener klin. Wochenschrift, 1904, p. 119.

[3] Ibid., 1904, p. 276.

Kreissl concludes that a positive reaction speaks very strongly for typhoid, providing typhoid can be excluded from the past history of the patient; a negative reaction does not absolutely exclude typhoid; the reaction is of especial value in the recognition of mild cases; that the reaction is often valuable in the early recognition of typhoid; that there is no parallelism between the severity of the infection and the intensity of the reaction.

Our efforts at early diagnosis may be often aided by the blood cultures. So far this method has not been much employed outside of the hospital, for the practical difficulties in its way in ordinary house practice are very great. Puncture with a needle is always objected to by patients who are not under complete control, and this, which is a great obstacle to the routine employment of blood culture, is not so difficult as the carrying to the bedside for inoculation the flask of bouillon. An article by Rolly, in which he describes a method of overcoming the latter difficulty, is very welcome.

Rolly[1] makes a report upon 50 typhoids in which he made blood cultures on the first day of entrance into the hospital. In 44 of these—*i. e.*, 88 per cent.—the typhoid bacillus was found in varying numbers. The number of colonies in 20 c.c. of blood varied from 1 to 480. There was no evident relation between the severity of the disease and the number of colonies. Rolly is of the impression that the number is dependent rather upon the stage than upon the severity of the disease. Those cases in which the culture was made late there were few colonies and all cultures made after the fever had passed were sterile. In 16 cases the typhoid bacilli were found in the blood before the Widal reaction appeared.

Rolly has tried to devise some means by which the blood cultures can be made in private as well as in hospital practice. He first tried defibrinating the blood in sterile vessels with glass pearls, but this failed because in a few hours the bacteria are destroyed by the undiluted blood. After trial with several other methods he finally found the following satisfactory: He dissolved 5 grams of peptone and 50 grams of grape-sugar in 100 c.c. of water and boiled the solution from five to ten minutes. Twenty c.c. of this fluid were put in a 50 c.c. test-tube and, after sterilization, corked. Twenty c.c. of blood added to this remained fluid for a day, and even after a longer period was suitable for addition to glycerin agar. Typhoid bacilli in such a fluid do not increase nor are they destroyed.

Quadrone[2] reports the finding of the Eberth bacillus in the blood upon the third and fourth day of 2 cases of typhoid with sudden onset. By the twelfth day they had disappeared. The Widal reaction was intense in these cases and appeared the same day the bacilli were first found.

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[1] Journal of Tropical Medicine, 1904, p. 271.

[2] Gazzeta degli ospedali e della cliniche, March 20, 1904, vol. xxv. p. 364.

This case is quoted merely as an illustration of an early diagnosis made by blood cultures several days before a positive diagnosis could have been made by the ordinary clinical methods.

The older methods of diagnosis, methods in which the great majority of cases will lead one quickly to a correct diagnosis, have been very carefully reviewed by Wesener[1] in an article upon the diagnosis and prophylaxis of typhoid based upon 690 cases personally observed by him during the past twelve years in Aachen. The report is valuable, as all reports of large series of cases carefully observed by one man always are, more so by far than much larger series collected from various sources.

Wesener regards the following six symptoms as the important diagnostic evidences of typhoid, and while one will easily agree that they are important there are two others more valuable in my opinion than some listed by him, namely, the leukopenia and the relatively slow pulse during the early weeks of the disease. Wesener's list is:

1. The peculiar fever.
2. The splenic tumor.
3. The characteristic roseola.
4. The diazo reaction.
5. The Gruber-Widal reaction.
6. The demonstration of the typhoid bacilli.

Wesener has found, as most working in hospitals find, that the course of the fever is of but little help in the diagnosis, because the cases usually enter the hospital in the height of the disease after the period of step-like rise. When the case is observed from the onset this course of temperature is highly suggestive.

The splenic tumor was palpable in 508 of the 690 cases—*i. e.*, 73 per cent.—and doubtless this represents less than the true percentage because of the short time that certain of the cases were under observation. The doubtful cases are also excluded, and anyone who has made it a rule to feel for the spleen in all typhoids will realize how easy it is to be uncertain whether or not the spleen is palpable. Wesener does right to disregard the percussion of the spleen. It is too unreliable to be considered.

Unquestionable roseola were present in 399 cases, questionable in 4, and wanting in 105—*i. e.*, they were present in 78.5 per cent. Unfortunately nothing is said of their varying frequency in different years. I have no suggestions to make as to the explanation of the fact, but there is no question that in some years nearly all cases show the roseola, while in others almost none of them do.

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[1] Münch. med. Woch., 1904, p. 993.

The diazo reaction was found 433 times; 20 times no or only a single examination was made, and in 55 the test was absent. Usually these were cases entering late in the disease or dying in a day or two. The reaction was positive in 85.2 per cent. This is rather lower than the results of my personal experience. The diagnostic value of the diazo, however, is negative rather than positive. Its presence does not mean that the case is one of typhoid fever, but its persistent absence makes it about 15 to 1 that it is not typhoid.

The Gruber-Widal has been employed since 1897 upon 209 cases. It was present in 157, doubtful in 18, negative in 34—*i. e.*, it was positive in 75.1 per cent. of the cases. It is probable that this percentage is too low, for in 19 of the 157 cases in which the reaction was positive the first test was negative. In 20 of the 34 negative cases the test was used but once, and it is reasonable to suppose that some of these would have given a positive reaction later had it been possible to repeat the test.

The above symptoms are tabulated as follows, M. standing for splenic tumor, R. for roseola, D. for diazo reaction, and W. for positive Widal:

Symptoms found.	M.R.D.W.	R.D.W.	M.D.W.	M.R.W.	M.R.D.	D.W.	R.W.	M.W.	M.D.	R.D.	M.R.	W.	D.	R.	M.	O.	Not reliable.	Total.
No Widal made,	...	...	...	...	125	...	...	...	17	74	10	...	30	10	4	18	16	299
Widal made,	93	39	8	2	9	4	5	2	8	4	1	1	4	2	2	2	28	209

The most constant symptom is the diazo reaction, but, as already pointed out, its presence is of less significance than its persistent absence. It is unfortunately often present in just those conditions most difficult to differentiate from typhoid fever.

The presence of roseola is the next most constant symptom, and their presence is of greater significance than their absence. They are wanting in a considerable, sometimes a high percentage of the cases, but while they may be present in such diseases as sepsis and miliary tuberculosis, they rarely are.

The diagnostic value of the Gruber-Widal reaction is lessened by the fact that it may fail to appear in typhoid, and has been found by Wesener in malignant endocarditis, influenza, miliary tuberculosis, and sepsis.

An early symptom of typhoid, which has not yet received the general attention its value warrants, is the leukopenia. My personal experience leads me to a high opinion of its value, and it has repeatedly led me to suspect some other infection in cases which, otherwise, I would have unhesitatingly pronounced probable typhoid.

The subject has been carefully studied by Kast and Gütig.[1] There are very few acute infectious diseases which cause a reduction of the number of leukocytes, and of these typhoid is the commonest and most important.

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[1] Deutsche Archiv klin. Med., lxxx. p. 105.

Kast and Gütig base their report upon the examination of 148 typhoid suspects, of which 103 proved to be typhoid. While the great majority of the cases were between the ages of nineteen and twenty-four, the leukopenia is not peculiar to this period of life. The cases were of all grades of severity; 21 of the 103 ended in death, 31 cases were severe, and 53 were mild. The great majority of the counts were made from the sixth to the twentieth day, but the earliest count was on the fourth day.

Counts under 7000 were regarded as diagnostic of typhoid, 7000 to 9000 were looked upon as doubtful, and the count over 9000 was regarded as evidence against the diagnosis of typhoid. Of the 53 mild cases 47 showed counts under 7000, 4 were between 7000 and 9000, and 2 were over 9000. Of the 31 severe cases 30 were under 7000 and 1 was between 7000 and 9000. Of 21 fatal cases 20 were under 7000 and 1 was between 7000 and 9000. Thus of the 103 cases 92.4 per cent. showed a count under 7000, and that too irrespective of any existing complication.

Many authors have reported hyperleukocytoses as appearing when complications such as pneumonia, angina, bronchitis, otitis, phlebitis, and peritonitis develop, but othere have failed to find leukocytosis even when serious complications manifest themselves. Forty of these cases were complicated, and of these 25 were so at time of first count; of this 25 20 showed a count under 7000, 3 between 7000 and 9000, and 2 over 9000—*i. e.*, 80 per cent. of the cases maintained a leukopenia in spite of complications. These complications included pneumonia, peritonitis, and periostitis. In several cases the blood could be counted both before and after complications, but leukocytosis did not develop. In 3 cases of hemorrhage increase in leukocytes once to 29,000 occurred.

Prognostically the leukopenia is not of much value and in a general way a continued high count is favorable, but recovery may occur even after very marked leukopenia. Even marked leukopenia was observed as early as the fourth and fifth day.

The percentage frequency of hypoleukocytosis has been compared by Kühn and Suckstorff with other symptoms, as follows:

Widal, 95 per cent; leukopenia, 90 per cent.; splenic tumor, 86.6 per cent.; diazo, 75 to 85 per cent.; roseola, 69 per cent., and, as regards early diagnosis, they are arranged: Hypoleukocytosis, Widal, roseola, diazo, splenic tumor.

Of Kast and Gütig's 103 cases 14 gave a negative Widal at a time when they showed a leukopenia, and in 9 of these there was neither a splenic tumor nor roseola.

There are a number of other conditions seen with leukopenia, namely, starvation, measles, morbus Banti, anæmia, malaria, tuberculosis, tuberculous meningitis, acute miliary tuberculosis, sepsis, severe pneumonia, but in none is the leukopenia so marked or so constant. The ease with which the sign can be discovered without the use of a laboratory, its early appearance, and its high constancy make it a most important addition to our diagnostic resources. There are still several points which require elucidation, particularly what the relative percentage of the various forms of white blood cells is in the leukopenia of typhoid.

Hoke[1] has had an unusual opportunity to study a question of some interest, namely, whether the bacilli circulating in the blood are excreted in the milk of a mother sick with typhoid. The report is as follows: He was unable to find them. This corresponds to the conclusion reached by Basch and Weleminsky, who performed a series of experiments upon animals, but never found the bacilli in the milk. Hoke found, however, that the agglutinating bodies were excreted in the milk and the Widal reaction was present in the milk even in a dilution 1:200.

The ever-interesting subject of *typhoid in children*, to which reference was made last year, has been considered during 1904 by Adams,[2] who reports a study of 387 cases of typhoid fever treated in the Children's Hospital of the District of Columbia. It is now generally conceded that infants do not possess the immunity to typhoid fever which they were so long credited with, and note is made of this large series of cases less because there is anything new in the report than because it is a large series observed in one hospital and practically by one man.

Sixty-two per cent. of the cases were admitted during the months of July, August, and September. Sex has no influence as a predisposing factor, for 172 cases were boys and 165 were girls.

The influence of age is not perfectly clear from the report, but one may say the cases are less common during the first two years, but from then on age has but little effect.

There were 37 autopsies, in all of which the characteristic lesions were found in the intestines; the spleen was almost invariably enlarged.

The mode of onset does not differ from that in adult cases. Convulsions are infrequent, conspicuously so when one recalls the frequency with which they initiate the infectious diseases in children. Possibly this is due to the fact that the onset is more gradual in this than in the infections common to childhood.

The temperature follows the usual course, but ends by crisis more frequently than one would expect, in 19 cases. This is so greatly at variance with the typical ending that one may be forgiven a suspicion as to the correctness of the diagnosis in certain of these cases, particularly so when no less than 14 of them were seen previous to the days of the Widal and diazo reaction.

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[1] Zentralblatt für innere Medizin, 1904, p. 382.

[2] Archives of Pediatrics, February, 1904.

The Widal reaction was employed constantly since 1896 and was positive in all but a very small proportion of the cases, in 86.8 per cent. of the cases in which it was employed. The diazo reaction, which has been found more constant than the Widal by most observers, was present in but 40 per cent. of the 182 cases in which it was employed. Perforation occurred eleven times, making 3.2 per cent.

The mortality was 14.2 per cent. for the whole series, but each succeeding decade has shown an encouraging reduction: 1872 to 1882, 26 cases, 8 deaths, mortality 30.76 per cent.; 1882 to 1891, 59 cases, 12 deaths, mortality 20.33 per cent.; 1892 to 1903, 252 cases, 28 deaths, mortality 11.1 per cent. Adams believes this reduction due to the increasing employment of hydrotherapeutic measures.

Previous to 1892 hydrotherapy was only irregularly employed. From 1892 to 1898 the treatment was hydrotherapy, antiseptic and antiperiodic. Eighty-eight cases were treated in this way with a mortality of 11.36 per cent. Since 1899 pure hydrotherapy has been employed in 164 cases, with a mortality of 10.97 per cent.

Several of the complications of typhoid have received careful discussion. Probably no one of the acute infections is so prolific of complication as typhoid, and while most of them have in the past received repeated consideration, many have not been extensively reviewed within recent years, that is, during the period in which so many of the older ideas have undergone change or suffered complete abandonment.

Thayer[1] publishes an analysis of 42 cases of *venous thrombosis* observed in the course of typhoid fever: 39 of these were observed in the course of 1463 cases—*i. e.*, 2.6 per cent.; the other 3 entered during or after convalescence from the typhoid; 5 of the 39 cases died, and 2 of these directly as a result of the thrombosis, 1 by pulmonary embolism, and 1 by embolism of the inferior vena cava and right auricle.

The thrombus was in the lower extremity in 42 cases, once in the upper and once in the pulmonary artery, twenty-six times left-sided, five times right-sided, and nine times bilateral.

The femoral vein was the one most often involved, twenty-one times; the popliteal vein five times; veins of the calf five times; the internal saphenous three times; the pulmonary artery once; the pulmonary artery and common iliac once; the axillary vein once.

The commonest time of onset was the third to the sixth week; this period includes 24 of the 42 cases. The clinical picture of thrombosis consists of fever, present in almost all cases and often preceding any of the local symptoms. Chills occur in nearly one-third of the cases, and

[1] Medical News, 1904, p. 637.

may precede, accompany, or follow the thrombosis. There may be one or several chills, and a week may elapse after the chill before the thrombosis presents itself. Pain is the first local symptom; it varies in intensity and duration, but is always present. In cases of femoral thrombosis the pain appears along the course of the femoral vein, and in Scarpa's triangle, sometimes in the calf or popliteal space. The onset may be sudden. In case the iliacs are involved the onset may be with sharp abdominal pain.

Œdema appeared in all of 39 cases. The thrombosis could be felt in 16 of the 39 cases. Leukocytosis was present in 12 of 22 cases examined for it, and the extremes of the count were 24,864 in a case of iliac thrombosis in the third week, and 2700 in one of popliteal thrombosis in the sixth week. In 8 cases the leukocyte count was made on the day of onset and showed numbers ranging from 6000 to 20,000. It should be remembered that the bulk of the cases occurred at a period in which a normal typhoid shows a reduced number of leukocytes.

The subsequent course was followed in 16 cases over periods varying from a few months to twelve years. In the great bulk of these the patients suffered from œdema, cramps, pains, varices, ulcers, and paræsthesias up to the period when last seen. One case of popliteal thrombosis had had no trouble whatever.

No complication is more to be feared than the *intestinal perforation.* The clinical picture resulting from it is now quite clearly outlined, but the ideas of treatment have so modified in the last years that the subject has received renewed attention. During the year several extensive articles have appeared, but only one is selected for review.

Harte and Ashhurst[1] make a report upon 362 laparotomies for intestinal perforation in typhoid or for peritonitis without perforation. In a total of 8881 cases of typhoid perforation was found to occur in 222—*i. e.*, 2.54 per cent. The white race is more disposed to perforation than the colored, and for some curious reason the male and female cases bear the numerical relation of 4 to 1. Age does not have much influence, although the cases after thirty years are rather more numerous than would be expected; 33 per cent. of the cases were over that age. The stage of the disease has much influence, as is natural, considering the pathology: 2 per cent. during the first week, 56.6 per cent. during the second, and 41.2 per cent. during the third.

Tympanites acts as a predisposing cause, and the exciting causes are mainly mechanical; indiscretions in diet, purges, too large or too forcible enemata, sudden movements, and the like.

The perforation is usually single and usually small, rarely being more than one-half inch in diameter, and usually much smaller than this. It is oftenest opposite the mesenteric attachment, and in about three-fourths of the cases is within one foot of the cæcum. It may be in the colon, sometimes in Meckel's diverticulum.

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[1] Annals of Surgery, January, 1904.

The diagnosis is easy in typical cases, but such are exceptional. All the symptoms may be present without perforation, and all may be absent and yet a perforation be found at the autopsy.

Pain is the most valuable symptom, though not pathognomonic. It is usually stabbing in character, and in the right lower quadrant. It may be located in the bladder or penis. It varies greatly in intensity and a very apathetic patient may not complain at all.

Vomiting is not indicative of perforation, but when it occurs for the first time coincidently with pain it is very suggestive.

Sweating and a fall of temperature of 4° to 6° is not uncommon. Muscular rigidity, especially of the right rectus; tenderness, a rapid rise in the pulse rate, and other evidences of shock are also symptoms demanding attention.

The differentiation between perforation and hemorrhage is sometimes difficult, especially so in patients who have had hemorrhages. Pain is usually wanting in cases of hemorrhage. The symptoms of shock are common to both.

Twenty-six per cent. of the cases treated by laparotomy recovered. Death was hastened in but few instances by the operation.

The diagnosis of this complication is often difficult because of the stupor of the patient depriving us of several of the earliest and most suggestive symptoms. In view of this fact I believe that an exploratory laparotomy should be made whenever a diagnosis of perforation is a reasonable one.

All must now agree that there is but one method of treatment, and that is surgical. Medical treatment is a complete failure, and while the result of the surgical operation is not so good as one would desire, this is, at least in part, due to the fact that the operation is often delayed too long. This delay can be avoided by operating whenever the suspicion of a perforation is a reasonable one.

Another possible cause of peritonitis complicating typhoid fever is the *rupture of a suppurating mesenteric gland.* Such a case is recorded by Le Conte.[1] He reports an instance of rupture of a mesenteric gland in typhoid fever. This complication is an extremely rare one, although change in these glands is a constant phenomenon in typhoid. Le Conte concludes that the changes which lead to rupture are not due to the typhoid bacillus, but to the presence of the staphylococcus or streptococcus, or to thrombosis of larger vessels of the mesentery outside of the gland.

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[1] Journal of American Medical Association, 1904, ii. p. 1188.

The clinical picture was that of an intestinal perforation. The case was operated on within six hours after the onset of sudden, very severe abdominal pain. This pain, however, was not the first, for the previous day the patient complained of pain, had a sudden rise of temperature, with abdominal distention, slight rigidity of the right rectus muscle, tenderness, and almost complete disappearance of the liver dulness. At the operation a localized peritonitis was found. The lower part of the ileum was inflamed, covered with lymph, and showing one ulcer which appeared to be about to perforate. This was covered by Lembert sutures. The mesentery at the junction of ileum and cæcum was much thickened and inflamed. One of the ileocæcal glands had broken down and perforated the peritoneal coat. The patient recovered.

Two other cases are mentioned. In each the clinical diagnosis of perforation was made and both died in spite of the operation.

The relation of typhoid fever to affections of the biliary tracts is more important than is generally supposed, the typhoid and paratyphoid bacilli being not infrequently the cause of cholecystitis and gallstones. This subject has in the last year or two received considerable attention. A new fact in this connection is brought out by Blumenthal, namely, that gallstones due to the action of these bacilli may develop in people who give no history of any antecedent typhoid.

Blumenthal[1] reports two cases of *gallstones* in which he was able to demonstrate in one the typhoid and in the other the paratyphoid in the gall-bladder. The cases are noted because neither of the patients gave a history of any disease resembling even remotely typhoid fever. The case in which the typhoid bacillus was found had had several cases of typhoid fever in her family, her husband and brother, but the other case gave no such history of exposure.

The serum of each case reacted to its particular bacillus strongly. The cases show that it is possible for the typhoid and the nearly related paratyphoid bacilli to enter the bile tracts and there excite inflammation without causing the usual intestinal infection and constitutional symptoms, and that the serum of such patients agglutinates the particular bacillus at work.

The appearance of a Widal reaction in case of *icterus* has been noted a number of times, and is important in the bearing which it may have upon the subject just referred to. Articles by Zevi and by Kämmerer review the subject so thoroughly that both are quoted rather freely.

Zevi[2] reports a study of the Widal reaction in icterus. A reaction under this condition has been repeatedly observed.

Koehler found it positive in 6 of 8 cases.

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[1] Münchener med. Wochenschrift, 1904, p. 1641.

[2] Wiener klin. Wochenschrift, 1904, p. 860.

Zupnik found it positive in 7 of 11 cases.

Megele found it once with liver abscess.

Eckardt found it in dilution of 1:1000 in 2 cases of Weil's disease, and once in cholelithiasis 1:100.

Eisenberg and Keller once with lithiasis 1:500 and once in icterus of unspecified cause 1:50.

Langstein and Meerwein once 1:100 with cholelithiasis.

Königstein found no reaction with the bile in 21 cases of icterus, and also failed with the bile of ten normal rabbits.

Kreissl reports 8 cases of icterus all negative in 1:30 dilutions.

Gilbert and Lippman report a study of 30 cases of which 26 gave no reaction.

Steinberg had 7 in 22 cases showing a positive reaction.

Zevi examined the bile of 34 bodies in the Pathological Institute, and found in all a negative reaction. This confirms the experiments of others with the exception of Köhler.

Zevi examined 24 cases of icterus, but found a positive reaction in but 4:1 cystoma ovarii, 1 carcinoma ventriculi with liver metastases and a history of typhoid fever eighteen years before, 1 with atrophic cirrhosis, and 1 of carcinoma of the gall-bladder with stones.

The 4 positive cases gave agglutination of the paratyphoid bacillus as well as of the typhoid, and also a fairly well-marked agglutination of the Flexner dysentery bacillus, and very slight agglutination of the Shiga bacillus.

Kämmerer[1] reports a study of the Widal reaction in the blood of patients showing icterus. It has been generally accepted up to the present that a reaction in dilutions above 1:40 was peculiar in typhoid, but numerous authors have reported this reaction in dilutions beyond this point in cases of icterus, notably Eckart, who has made such reports, observing 8 cases in which reaction occurred with dilutions of 1:100, even 1:1000.

In cases in which there is a mechanical stasis of the bile it would occur to one that the bile itself might be capable of causing the agglutination of the bacilli, and Köhler was able to cause the agglutination sometimes even with dilutions of the bile up to 1:160. He referred the reaction to the taurocholic acid and compared it to the reaction caused by salicylic acid, ammonia, formalin, etc. In cases in which the jaundice is due to changes in the liver cells one might think of some yet unknown change in the blood as the cause of the reaction.

Kämmerer examined 50 cases of icterus to determine the number of cases in which the Widal occurred with higher dilutions than 1:50. He found this but once, in a case of catarrhal icterus, the reaction being positive at 1:75. This patient had never had typhoid fever. In 8 other cases the reaction was positive in dilutions ranging from 1:20 to 1:50. In all the other 41 cases the reaction was wanting in dilutions beyond 1:10. This study has a bearing upon the theory of the Widal, but has no particular bearing upon the clinical significance of the Widal in typhoid because of the great infrequency with which one is called to differentiate typhoid from diseases in which icterus occurs.

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[1] Berliner klin. Wochenschrift, 1904, p. 699.

As an example of the not rare *meningotyphoid* we may quote a case of Achard and Paisseau, particularly as it furnished a striking instance of the great value of the bacteriological methods in the diagnosis of acute infections, and of the folly of placing too much reliance upon one symptom. It is to be regretted that no cultures were taken from the blood as well as from the spleen. In spite of the apparent harmlessness of splenic puncture, the profession has not yet overcome its unwillingness to employ this diagnostic aid, and if this puzzling case could have been as well solved by the blood culture as by the splenic puncture it would be well to know it.

Achard and Paisseau report the case of a boy of eighteen years, who after about three weeks of severe headache, backache, and general malaise, entered the hospital with marked stiffness of the neck, distinct Kernig sign, nocturnal delirium, vomiting, temperature 39.5° to 40° C. Lumbar puncture showed a clear fluid containing many lymphocytes; cultures negative. Three days later roseola and a positive Widal were noted. The next day the spleen was punctured and cultures of Eberth bacilli were obtained. The case ran the ordinary coures of typhoid and recovered.

This case would be described as a meningotyphoid, and the meningeal symptoms would formerly have been attributed to meningismus rather than to meningitis; but to-day it seems likely that very many of the cases formerly regarded as mere meningeal irritations are really meningitis. Lumbar puncture has proven to us that many cases are truly meningitis, even though they end in recovery. Even cases in which the cerebrospinal fluid contains so many white corpuscles as to be milky white and shows the presence of micro-organisms recover. This particular case is noteworthy because the meningeal symptoms, together with the lymphocytosis of the cerebrospinal fluid, would strongly suggest the possibility of a tuberculous meningitis, and one must therefore not be too ready in diagnosing tuberculous meningitis from this combination.

Prognosis. Nothing is more difficult than prognosis, and this is true of acute as of chronic diseases. Because of its great diversity in course and because there is no absolute relation between the severity of the symptoms and the extent of the intestinal lesions, a paper containing suggestions as to the prognosis of typhoid fever is worthy of comment. Sedgwick, in the *Birmingham Medical Review*, February, 1904, reports his experience in 460 cases of typhoid, and draws attention to points which will be of assistance in prognosis. Prognosis in this disease must always be guarded, especially because many complications may appear suddenly and change a mild and apparently favorable case into one which is well-nigh hopeless.

Generally speaking the prognosis is better in children than in adults, for the fever is usually milder and less prolonged. Diarrhœa and tympany are exceptional and the serious complications less common than in older people.

Stout people, no matter what may be the cause of their obesity, are not good subjects for typhoid fever, or any other infection, for that matter. A gradual onset indicates a milder course. Out of 117 cases in which the onset was gradual only 39 ran a severe course. Of 46 which began suddenly, 26 were severe.

High temperatures are generally associated with marked alteration in most of the bodily functions, and especially those of the nervous system. The marked improvement in prognosis in typhoid fever in recent years is undoubtedly due, in a great degree, to the means taken to lower the temperature by hydrotherapeutic measures. Cases in which the functions of the body are but little disturbed by the temperature have a better prognosis than those just mentioned.

The pulse rate is a good indication of the severity of the attack. In cases of moderate severity it is generally a little raised, usually to about 100 beats per minute, but it is by no means uncommon to find a high temperature with a normal or even subnormal pulse rate. Sudden changes in the pulse rate are important guides to threatened complications. Postfebrile bradycardia, even down to 40, is not uncommon, and until the pulse improves the patient should be kept in bed.

In severe cases the tongue becomes dry, brown, and fissured, and such a tongue indicates a severe gastrointestinal inflammation, and such cases are often associated with diarrhœa or hemorrhage.

Meteorism is a grave symptom, for it favors perforation.

Constipation is favorable, while persistent diarrhœa is bad. Of 65 cases with constipation only 2 died, while there were 22 severe cases and 5 deaths in 31 cases with diarrhœa.

Hemorrhage is a serious complication, but death is not often due directly to loss of blood. Hemorrhages during the first few days are not so very bad, but those about the end of the first week are serious. Even worse are those occurring at the end of the third or beginning of the fourth week.

Nervous symptoms occur chiefly in the very severe cases and in alcoholics. They are always of serious import, and the more so the more marked they are.

One must also consider the general character of the epidemic in forming a prognosis. The more severe the general run of cases, the worse becomes the prognosis.

Another aspect of the question of prognosis is taken up by Curschmann,[1] where he discusses the question whether a typhoid fever can end in death within a few days after the first symptom has appeared. Every experienced physician would admit this, as Curschmann says. He first discussed the ambulatory form of typhoid, cases which continue to go about in spite of the fact that they are suffering from an Eberth infection. The factors which make this possible vary. It may be that the infection is mild or that the reaction which the host opposes to the infection is so great that no or only moderate symptoms result.

Many such cases never apply to the physician, while in other cases the physician is led by the mildness of the symptoms to some indifferent diagnosis. Thus, a diagnosis of gastric catarrh, of influenza, of neurasthenia, of anæmia, or of malaria may be made. The frequency of these errors is reduced by the employment of the modern methods of examination, especially the Widal reaction and the culture of the specific organism from the blood.

It is easy to see how such patients are more liable to serious intestinal manifestations than those who are protected. Thus, hemorrhage or perforation may occur in one not previously manifestly ill, and death result in a few days or even hours after the onset of the symptoms.

A perforation may occur at the appendix and the case present itself as an appendicitis.

Curschmann mentions the case of a woman who had been complaining of symptoms, which had been referred to an influenza, for a period of about two weeks. She suddenly began to suffer from most severe dyspnœa, and died within half an hour of pulmonary œdema. The autopsy showed a typhoid fever at the end of the third week, and death due to pulmonary embolism, the source of the embolus being the right venrticle. Another form of typhoid which may cause sudden death is the foudroyant or hyperpyretic form, from which death may occur in a week or even less. Beginning with a single or repeated chill, the temperature rises rapidly and reaches the maximum point in twenty-four to thirty-six hours. It continues with very slight morning remissions. The pulse becomes very rapid and signs of cardiac failure appear early. The patient is delirious from the start and rapidly becomes stupid. The spleen even in the beginning becomes greatly swollen; roseolæ are exceptional. The patient dies from the intensity of the intoxication in a week or less.

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[1] Deutsche med. Wochenschrift, 1904, p. 610.

Sometimes a case which shows this foudroyant, asthenic course will prove to be the ending of an ambulant case.

Another but rarer rapidly fatal form is the hemorrhagic type. Hemorrhage into the skin and from the various internal organs characterize these cases. Curschmann has seen but six examples of this form. Death occurs early.

As might be expected from the general consensus of opinion now prevailing in regard to the treatment of typhoid fever, this aspect of the question has received less discussion than in former years.

Efforts at the development of a specific serum continue, but as yet no definite conclusions can be drawn. Efforts are also being made to develop some form of protective injection, and Smith[1] publishes a careful review of the Wright antityphoid inoculations, describing in detail the methods and results. The conclusions which he draws may be summarized as follows: The antityphoid inoculations (using dead bacilli and their toxins subcutaneously) have a distinct protecting influence, but to obtain the full protection the inoculation should be made, say, two months before the exposure to infection; but even when performed only shortly before exposure the procedure is beneficial. The protection lasts for some years and is in the proportion of 3 to 1, being, therefore, much less than that shown by the vaccination against smallpox. At present its value is not sufficient to warrant general adoption, but is of distinct value where typhoid fever is epidemic, and to those who have much to do with typhoid cases.

Hare[2] again makes an appeal for a more liberal dietary for patients with typhoid fever. Both theoretical considerations of physiological facts and personal experience have convinced him of the utter inadequacy of the pure-milk diet in the treatment of typhoid fever. He gives all patients after the first week of typhoid from one to two soft-boiled eggs a day, in addition to the ordinary allowance of milk, and varies the diet by the use of curds and whey, rice which has been boiled to a pulp, barley, wheat, and oatmeal gruel, and a cup of cornstarch, with vanilla or some other flavoring substance. This diet has led to an almost complete disappearance of the ataxia so often seen during the convalescence of typhoid, and secondary complications like furuncles and bed-sores no longer occur. In employing this diet due allowance must be made for the feeble digestive powers of the patient, and pepsin and hydrochloric acid should be given with the proteid foods, and taka-diastase and pancreatin with the carbohydrates.

Hare further believes that the element for good in the cold baths is not so much the cold as the rubbing or massage which follows their use. This aids the dissipation of the body heat, readjusts the circulation, and exerts on the patient the beneficial effects which follow the use of massage, as seen in the rest-cure treatment of neurasthenia. Equally good results can be obtained if these patients are properly sponged, with friction, instead of being plunged. The sponging does not require moving the patient.

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[1] Journal of Tropical Medicine, 1904, 271.

[2] Therapeutic Gazette, September 15, 1904.

With much of this, one can agree. I believe fully that the milk diet as usually employed may be the source of considerable harm, that the disease can be made much more endurable, and the patient's return to strength hastened by a more generous diet such as Hare outlines, and to which a number of things can be added by a little thought and ingenuity. I think also that it is possible to carry the cold bath too far, but I believe that it is easier to fail to carry it far enough than to carry it too far. Friction and massage are useful and can be practised as well with a sponge bath as with a plunge. Here as elsewhere one must individualize intelligently, and not attempt to practice by rule of thumb.

Paratyphoid continues to claim much interest in the larger centres and hospitals where the facilities for its study exist. It is to be hoped that the near future will see some means of diagnosis adapted to the uses of the general practitioner, which will enable him to separate the typhoid and paratyphoid cases.

Clemens[1] publishes a careful review of the literature of paratyphoid, and from it the following description of the clinical course is taken: During a prodromal stage of from three to eight days, with symptoms such as occur during the same period of typhoid—headache, epistaxis, nausea, weakness—there often appear catarrhal symptoms from the throat, with swelling sometimes of the cervical glands, to which is sometimes associated swelling of inguinal glands. Conjunctivitis, œdema of the eyelids, and bronchitis also; sometimes herpes; diarrhœa and constipation are about equally common; not rarely severe pain in abdomen. Fever often rises rapidly, may be with chill, to 40° C. Sometimes with a gradual rise and a typical curve, but more frequently the course of the fever is more irregular, intermittent, not rarely ending by crisis, and lasting on average ten to twenty-two days.

Skin roseola are present in 80 per cent., single or multiple, often dark red, not only on abdomen, but also on face and hands; most marked about the twenty-first day; "some dark, macular spots on abdomen;" petechia are also described. Tongue appears as in typhoid.

Nose-bleed is common; bronchitis is not infrequent, but pneumonia is nowhere recorded.

Vomiting sometimes occurs; diarrhœa is often recorded, in 60 per cent. Intestinal hemorrhage occurs in 5 per cent. of cases.

No perforations yet recorded.

Pain in the abdomen, especially upper part, is often noted.

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[1] Deutsche med. Wochenschrift, February 18 and 25, 1904.

Spleen is often enlarged to percussion, sometimes palpable.

Delirium common, apathy, stupor, incontinence of urine and feces.

Albuminuria is common and casts frequent.

Diazo reaction occurs in 30 to 60 per cent. of cases.

Pulse soft, often dicrotic, relatively slow.

Blood shows leukopenia, then lymphocytosis and eosinophilia.

Relapse many times described, shorter, but otherwise like first attack.

Duration of disease twelve to eighty-four days.

Occurs in men more often than women; ages, seven months to sixty years, but great majority between twenty to thirty.

Diagnosis is made by culture from blood or feces and by the reaction of serum to various bacteria.

Conradi[1] reports the history of a patient, an eight-year-old girl, who was taken with fever, vomiting, pain in abdomen, constipation, and sore throat after eight days of prodromal symptoms. Temperature went up gradually, diarrhœa appeared, with roseola and enlarged spleen. Typhoid and paratyphoid bacilli were found in the stools. Patient recovered after an illness of three weeks' duration. The course was that of a typhoid except that the temperature was less regular than usual.

These cases open up new possibilities and further complicate this already too involved subject.

Flatau[2] reports a case of *optic neuritis* appearing in the course of a paratyphoid (typhus B.). In view of the great similarity of the clinical pictures resulting from infections with the typhoid and the paratyphoid, a resemblance so close that differentiation between them can be made only by means of serum tests and cultures, it is interesting to note that even the rare symptoms of typhoid infections occur also with the paratyphoid.

Uhtoft found, among 253 cases of optic neuritis resulting from infection, 17 examples of typhoid fever. This complication usually appears in the second or third week of the disease, and causes more or less impairment of vision, hemorrhages into the retina, and, lastly, partial or complete atrophy of the nerve.

Yellow Fever. While search for the specific organism of this disease continues, the medical world is in practical accord over the manner in which infection of the human being occurs. The value of the work done by the Americans in Havana is now generally admitted, and other places, by employing the methods of stamping out the disease in that city, are meeting with equally gratifying results.

The spread of the disease by the mosquito suggests strongly the possibility that the specific cause of yellow fever is not a bacterium, but a protozoa.

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[1] Deutsche med. Wochenschrift, 1904, p. 1165.

[2] Münchener med. Wochenschrift, 1904, p. 1245.

Guitéras,[1] in a report upon an epidemic of yellow fever at Laredo, Texas, draws some conclusions from his experience which demand attention and legislation. In the first place the results obtained through the efforts to combat the epidemic go to demonstrate that the mosquito (*Stegomyia fasciata*) is the only means of transmission of yellow fever, and that the efforts to destroy the same were productive of much good. Oiling all water containers and deposits of stagnant water completely prevented the reproduction of these mosquitoes. It was also manifest that in order to control an epidemic one must have absolute power to enforce sanitary means. Because the mosquito can become infected only during the first three days of the disease, it is important to secure the earliest possible notification of all cases in order to effectively screen them from the bite of the mosquito. It also became obvious that it is impossible to obtain good results without a mosquito-proof yellow-fever hospital. The difficulties of handling an epidemic are increased when an outbreak occurs on the frontier. Arrangements should, therefore, be entered into by treaty with contiguous foreign countries so that under such circumstances sanitary measures may be carried out jointly by the countries interested for mutual protection.

Whooping-cough.—Mamcalide[2] has made a bacteriological study of the sputum of 82 cases of whooping-cough and finds a bacillus which he calls Bacillus Z. This bacillus was found fifty-six times in the 62 cases in the stained sputum, and grew on agar plates sixty-seven times in 80 cases examined. It was missed altogether in only 5 of the 82 cases. He believes it to be the specific organism.

Experiments upon animals were not successful in causing a picture like whooping-cough. Cultures were then given by injections to three sheep and two horses with the idea of learning whether a specific serum could be produced.

After a prolonged course of such injections a serum was prepared in the way generally employed in obtaining the diphtheria serum. This serum was employed in 89 cases of whooping-cough, of whch 36 were cured and 53 improved only. The recovery in 22 cases took place in from eleven to thirty days, while in 14 it required from thirty-two to fifty days. Eight cases recovered after a single injection made respectively upon the eleventh, thirteenth, fourteenth, nineteenth, twenty-first, twenty-eighth, thirtieth, and forty-second days of the disease. Eighteen cases required two injections and the others received from three to six injections. The effect of the serum is shown in the smaller number of attacks, their lessened intensity, by the lessened vomiting, and by the abbreviation of the course. If the injection is given during the first two weeks of the disease, recovery may be expected in from two to twelve days.

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[1] Journal of American Medical Association, 1904, xi., 115.

[2] Zeitschrift für Hygiene, 1903, xlv. p. 469.

DISEASES OF CHILDREN.

By FLOYD M. CRANDALL, M.D.

Hemorrhagic Disease of the Newborn. The infections of the newborn infant have received considerable study during the past two or three years, and our knowledge of their causation has been considerably increased. This subject, as well as the mortality of early life and its causes, was considered in detail last year.[1] Much study has apparently been devoted during the past year to the hemorrhagic diseases of the newborn. Our knowledge of these diseases has been well presented in a paper by Wollstein.[2] She excludes traumatic hemorrhage and hemophilia, and believes that the cases to be strictly considered as peculiar to the newborn are those of multiple hemorrhages, which occur as morbus maculosus neonatorum, epidemic hæmoglobinuria or Winckel's disease, acute fatty degeneration or Buhl's disease, and syphilis hemorrhagica neonatorum. While much further study is required to determine the exact nature of the underlying condition and the direct etiological action in these cases, as well as the interdependence of the various forms in which the disease manifests itself, our present knowledge of its symptoms; clinical course, and pathological anatomy tend very strongly to prove that the process is one of infection. It seems certain that morbus maculosus, Winckel's disease, and Buhl's disease represent different varieties of the same disease; the difference being one of degree and varying with the condition of the child.

A specific micro-organism in these cases has not yet been found. The following bacteria have been cultivated from the heart's blood and viscera after death: staphylococcus pyogenes albus, staphylococcus pyogenes aureus, streptococcus pyogenes, a diplococcus resembling the diplococcus pneumoniæ, bacillus pyocyaneus, bacillus hemorrhagicus of Kolb, bacillus enteritidis of Gaertner, bacillus coli communis, and bacilli resembling that organism. The difficult technique of making blood cultures during life in young infants proves a grave and frequent obstacle to the complete and satisfactory study of the disease. Nevertheless, such cultures have been successfully made by several observers, with results similar to those obtained at autopsy. The bacteria almost invariably found have been the pyogenic cocci and the colon bacilli. Morphological study of the blood has not thrown any light upon the subject. The source of infection and its portal of entrance remain obscure in some cases, but in the larger number they are demonstrable.

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[1] Progressive Medicine, March 1904, p. 217.

[2] Archives of Pediatrics, September, 1904.

That hemorrhages do not occur in every case of sepsis in the newborn child is no argument against their sometimes occurring in cases of greater severity or increased vulnerability on the part of the child. The mouth, the gastrointestinal tract, and the umbilicus are the main points of entrance for the infection. The umbilicus does not necessarily show any inflammatory lesion as a result. However pus may be found in one or both hypogastric vessels within the abdominal cavity when the umbilicus has the appearance of being normal. Without a detailed anatomical study of each individual case at autopsy, therefore, even antemortem blood cultures may be, if negative, insufficient to justify a positive opinion as to the presence or absence of pyogenic infection. Until the cause of syphilis is positively determined it will be impossible to deny that the syphilitic poison alone may be the cause of hemorrhages into the skin and viscera without the addition of a secondary sepsis. Bacteriological study of cases of hemorrhagic disease in which syphilis was undoubtedly present tends to give results similar to those obtained in cases without syphilitic taint. That a syphilitic infant may present more points of entrance for a secondary or even a terminal infection is plain. The question must for the present remain an open one. Whatever may prove to be the specific or non-specific etiological factor in these hemorrhagic conditions, it would seem that one of its modes of action is a destructive one on the walls of the bloodvessels.

An interesting suggestion comes from the work of Flexner and Noguchi who have found in rattle-snake venom a substance they designate as hemorrhagin, and which proves to be a cytolysin for endothelial cells of bloodvessels. Histological studies have borne out this fact. That other poisons and the pyogenic bacteria as well may be proved to produce a similar toxic body is probable. It is along these lines of pathology that enlightenment on the subject of hemorrhagic disease of the newborn is to be looked for, heredity and the conditions influencing the child during and immediately after birth being given due consideration.

A case of *icterus neonatorum* with purpura is reported by Talley,[1] in which a very stubborn and dangerous hemorrhage followed a simple puncture made to obtain a sample of blood for examination. Among the remedies used locally in this case were cold adrenalin (1:5000, and, finally, 1:1000); tannic acid, alum, gelatin, and, finally, Monsell's solution, which was the only thing that had any effect. Even this was effective only for a time, as oozing would begin again at some part of the vesicle. The lancet wound stopped bleeding at about the end of the fourth day. Internally the child took first suprarenal extract, half a grain every two hours; and, later, adrenalin solution, 1:1000, one drop every two hours, without any immediate effect upon the hemorrhage. To this was added half an ounce of gelatin solution (one drachm to one pint) every three hours, but still without the desired result. Later, calcium chloride, half a grain every two hours, was given, and in less than forty-eight hours the oozing stopped, after having persisted for a week. The cause of jaundice in this case is obscure. The purpura was toxic, and, no doubt, dependent upon the jaundice. The difficulty of checking the oozing would make one chary of attempting blood examinations in purpuric conditions, especially in children. Monsell's solution locally, and calcium chloride internally appeared to have the best effect upon the bleeding, although the calcium chloride had the advantage of having followed the administration of adrenalin and gelatin. The suprarenal extract appeared to check best the appearance of new petechiæ.

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[1] Archives of Pediatrics, September, 1904.

Another excellent paper upon these hemorrhagic diseases in young children is that of Stowell.[1] Like many other conditions purpura is not a disease by itself, but a manifestation of other diseases. It is apparently due to several causes. Among them Stowell enumerates the following: vasoneurosis, as in locomotor ataxia; a drug, as iodide of potash; an infectious disease, as diphtheria or smallpox; a diathesis, as rheumatism; a special germ; and a toxin, as in enteritis following the ingestion of tainted food. He cites a series of cases from which he deduces the following conclusions as to the indications for treatment: Of maximum importance, probably, is the proper management of feeding of these patients, orange or lemon juice being frequently called for. Calcium chloride increases the coagulability of the blood and tends to check the hemorrhages. Vegetable acids and arsenic are useful. Among the drugs stypticin and suprarenal gland stand first, a number of cures of intractable cases having been reported through their use. Adrenalin probably is our best drug.

Septic Infections of the Newborn Infants. It becomes yearly more apparent that many of the serious diseases marked by hemorrhages, jaundice, or fever are due to septic infection. Many of these take their starting point from the navel, but any mucous membrane or abrasion of the skin may be the portal of entrance for septic bacteria. Bardillion[2] calls attention to the frequency of the otic origin of these infections in children. This is particularly frequent in hospitals. The infection may travel from the nasopharynx into the middle ear and spread from there to other localities. In the infants who die suppuration of the ear is commonly found. A very large number of the diseases believed to originate in the digestive system are septic infections from this locality. The digestive disturbance is secondary to the septic fever and is the result of the septic poison. The diagnosis of ear infection is difficult because perforation of the tympanum is rare and the local symptoms are not pronounced.

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[1] Medical News, March 26, 1904.

[2] Revue mens. des malad. de l'enf., November 9, 1904.

Ophthalmia Neonatorum. The prevention of this grave condition is the subject of an excellent editorial article[1] inspired by an extended paper by Dr. Sydney Stephenson, of Dublin. This article is a vigorous endorsement of Credé's method of prophylactic treatment. Stephenson quotes statistics which prove beyond doubt that if physicians carry out Credé's method they will do much toward diminishing the number of cases of blindness which develop every year. It will be remembered that Credé's method of treatment consists of placing a single drop of a 2 per cent. solution of nitrate of silver in each eye of the baby as soon as it is born. In 1881 Credé wrote that during the seven years before the adoption of his plan 10 per cent. of the 2266 babies born in the Leipzig Maternity Hospital developed ophthalmia, whereas after the systematic use of the silver solution only one child among 1160 was attacked. Howe, of Buffalo, has been foremost in this country in advocating this valuable prophylactic measure, and has published many papers in which he has earnestly urged the great good which follows the use of this measure whenever there is reason to suspect that the genital tract of the mother is infected. Statistics establish beyond question that the silver solutions are the solutions of choice for this purpose. Thus, Howe points out that the percentage of ophthalmia in 1223 births in which a 1 per cent. solution of silver nitrate was employed was 2.42, whereas when carbolic acid was employed it was 7.7. It is true that when a 1 per cent. corrosive sublimate solution is used the percentage drops to 0.47, but there is evidence to show that the mercuric chloride does not exercise so innocuous an influence upon the eye as does the nitrate of silver. Stephenson is convinced that the nitrate of silver is, after all, the remedy par excellence; nor does he believe that it commonly produces cloudiness of the cornea or other disagreeable after-effects, although he admits that an appreciable reaction with some reddening occurs in many infants who are treated in this manner. He can find no evidence to show that an application of this solution does cause actual inflammation of the conjunctiva. It is a noteworthy fact that Abbe, de Schweinitz, Pomeroy, and Hansell, four American ophthalmic surgeons, have reported instances of bleeding from the conjunctiva after the use of silver drops, but Stephenson does not believe that the drops were actually the cause of this complication. Against the inconclusive statements regarding injury to the cornea by the use of nitrate of silver may be placed the fact that among 30,000 babies treated by Credé's method by Leopold[1] an unfavorable reaction was never observed. The same remark applies to the 24,723 babies tabulated by Koestlin. It may be taken for certain, as Lucien Howe has shrewdly pointed out, that if a bad result could be traced to the Credé method the fact would be accorded a wide publicity. The sole disadvantage of the Credé method, according to Stephenson's view, is the production of a more or less trivial catarrh of the conjunctiva.

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[1] Therapeutic Gazette, December, 1903.

Umbilical Cord Hernia. This is not a common condition, as shown by the fact stated by Lindfors that it was seen only once in 5184 births occurring at the Munich Maternity Hospital between the years 1862 and 1881. Block records one in 5000 births at the Berlin Charité, and Vienne did not meet with any instance among 3043 births observed at the Paris Charité. Rogier states that it occurs in 2.7 per cent. of all newly born infants. A case is reported by Wollstein.[2] She divides cases of hernia funiculi umbilicalis broadly into two classes: those in which the intestines only are contained in the hernial sac, and those in which other viscera, especially the liver, lie outside the abdominal cavity proper. Many of the latter must be classified as cases of eventration or ectopia viscerum, when the umbilical opening is so wide that the larger part of the abdomen, with or without part of the chest, remains open and the amniotic sac contains most of the abdominal viscera. Such cases are frequently accompanied by lordosis or scoliosis. The difference between the two varieties is one of degree, as regards the extent of ventral body wall remaining undeveloped. Hernia into the umbilical cord is frequently accompanied by other malformations. Anencephalus, spinal curvatures, spina bifida, club-foot, persistent cloaca, multiple intestinal atresia, and extrophy of the bladder have all been recorded. The hernia is sometimes so large that it proves an obstruction to delivery. Its coverings consist of three layers—amnion, Wharton's jelly, and peritoneum. The contents vary. A few loops of small intestine alone may be present or the cæcum as well as most of the large intestine may be in the sac. The stomach, pancreas, spleen, liver, and kidneys have all been found outside the abdominal cavity. Cases in which the heart and part of one lung are prolapsed must be classified as true eventration. The umbilical cord is inserted at the apex of the mass. When the liver is contained in the sac the cord is usually found attached at the side toward the left, rarely on the right. Since the work of Linfors, in 1882, the radical operation for the cure of this condition has become general, and is indicated in every instance where prematurity or extensive malformations do not interfere with the child's viability. Cures have resulted from operations performed in the first hour after birth.

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[1] Berliner klin.Wochenschrift, No. 33, 1892.

[2] Archives of Pediatrics, June, 1904.

Fungosity of the Umbilicus. The treatment of this troublesome condition is discussed by Vargas.[1] It is difficult to treat on account of its persistency. It gives rise to much discomfort on account of the constant discharge and the impossibility of keeping the parts clean. Palliative measures are often completely useless, and the application of chemical caustics or the galvanocautery are the only methods which can be hoped to effect a cure. Vargas reports a case of umbilical fungosity in a child aged three and one-half years. The cord fell off on the fourteenth day after birth, and left a projecting and ulcerating stump which grew and discharged a fetid and sometimes a bloody fluid. This condition persisted the entire three and a half years. Before applying the galvanocautery a solution of protargol, 5 per cent., was applied to the fungosity on cotton. This was covered with some gauze and bandaged into place. After eight days the fungosity began to heal; the dressing was removed a week later, and the whole stump was found covered with a new epidermis. Twenty-five days after the second application of protargol the cure was complete.

Acute Pemphigus of the Newborn. Eighteen cases of acute pemphigus occurring epidemically in newborn infants are reported by McGuire.[2] The epidemic was traced to infection which was carried by a midwife who had the care of the children. The lesions appeared on the third or fourth day, and there were general symptoms of acute toxæmia. Eight children died, giving a mortality of 44.4. The observations made upon these cases demonstrated that the disease was due to infection with a pathogenic organism, the staphylococcus pyogenes aureus, conveyed from case to case by the midwife. Though appearing chiefly in the newborn and only fatal to these, it attacked also older children and adults. It was characterized by a bullous eruption on the skin variable in distribution and extent, the specific micro-organism being found in the contents of the vesicles. In many of the cases no symptoms other than the skin eruption were manifested, but a certain group of cases showed grave symptoms of a general infection, and invariably ended fatally. The point at which the systemic invasion arose in these cases was the unhealed umbilical scar. The treatment to all appearances had little or no effect upon the course and duration of the disease, whatever the result.

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[1] La méd. de los Ninos, vol. iv., No 45; Archives of Pediatrics, September, 1904.

[2] British Journal of Dermatology, December, 1903.

Sternomastoid Hæmatoma. Three cases of this not uncommon condition are reported by Kilmer.[1] It is invariably caused by injury during the birth of the child. In breech presentations in which force is used in trying to disengage the after-coming head by pulling upon the child's legs, this affection is almost certain to follow, on account of the laceration of the mastoid muscle. It is, therefore, more frequently seen in breech than in vertex cases, although any undue traction exerted on the presenting head may also cause a hæmatoma. Partial asphyxia of the infant greatly increases the danger of this injury on account of the atonicity of the muscle and the weakening of the bloodvessel wall. The hemorrhage takes place into the tissues of the sternocleidomastoid muscle. The size of the tumor varies from that of a small hazelnut to that of a walnut; sometimes the whole length of the muscle is involved. The position in which the infant holds his head is characteristic. The head is drawn toward the affected side by the contraction of the muscle. The usual duration of the swelling is from one to three months. A torticollis may persist after the swelling has disappeared. The differential diagnosis between hæmatomata and swollen lymph nodes is easily made by the fact that the hæmatomata are situated in the substance of the muscle while the swollen glands are not. The mass is present from the beginning, but it is not usually noticed until the baby is from two to eight weeks old, when it has become hard and firm. When the injury occurs the blood escapes from the torn vessel and causes a soft swelling between the torn muscle fibres; the swelling is somewhat tender. The tumor gradually becomes harder as the clot is converted into fibrous tissue.

If left to themselves these tumors probably always disappear. Little can be done to hasten their disappearance, though gentle massage may accomplish something. In one of the cases reported by Kilmer operation was insisted on by the parents. The pathologist's examination showed that the growth consisted solely of bundles of striped muscular tissue, fibrous connective tissue, and leukocytes sufficiently numerous to indicate inflammation.

Although in cases of hæmatoma the head is usually drawn to one side, the condition should be differentiated from simple torticollis. From a study of forty cases of congenital torticollis Maass[2] concludes that torticollis of intrauterine origin is rare. He believes that it usually occurs during birth, not as the result of tearing of the muscle, as Stromeyer contends, but in a traumatic necrosis of the muscle which has healed by formation of cicatricial tissue. This lesion, which is found principally in breech or forceps cases (80 per cent.), is due less to direct pressure on the muscle than to its hyperextension. When the distortion is too great to hope for regression by binder, massage, and moist heat, Maass has recourse to Mikulicz's operation (partial resection of the muscle). With older children a postoperative orthopædic treatment should be continued for a long time, in order to correct secondary deformities of the vertebral column.

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[1] Medical Record, February 7, 1904.

[2] American Journal of the Medical Sciences, January, 1904.

Premature Infants. The caloric needs of premature infants have been the subject of extensive investigations by J. L. Morse.[1] Six premature infants were fed on modified cows' milk prepared by the Walker-Gordon laboratory. The caloric value of the food was determined, and the babies were very closely observed. Morse concludes that gain in weight depends as much and perhaps more upon the digestion and metabolism than upon the amount of food taken or the age of the baby. From these observations the conclusions seem justified that the caloric need of premature infants is relatively greater than that of full-term infants. This greater need is due in part to the smaller size and comparatively large surface area of premature infants, which cause them to loose heat faster than do larger, full-term babies, and partly to the incomplete development of their digestive powers, on account of which they utilize a relatively smaller proportion of the caloric value of the food ingested. This conclusion emphasizes the necessity of protecting premature infants from loss of heat and of providing for them a food which will throw the least work upon the partially developed digestive powers.

Rachitis. Although rickets has been recognized and studied for more than two hundred and fifty years, there is still much uncertainty as to its etiology. It is widespread and has been studied by careful observers in many countries. It is essentially a disease of temperate and cold climates. It is especially prevalent among the people of warm climates who migrate to northern latitudes. Freeman[2] reports a series of observations made upon three groups of infants in New York with the object of determining the cause of the disease. He refers to the peculiar fact that' although the condition may be produced in lower animals, we find few consistent or conclusive expressions of opinion. It is a well-known fact that the bones of rachitic children show a deficiency of lime salts. The theory was long held, therefore, that the disease was due to deficiency of lime salts in the food. Practical experiments show, however, that if lime salts be withheld the bones are softened, but a rachitic condition is not produced. More lime salts are found in cows' milk than in breast milk, and the disease is common in localities where there is much lime in the water. The theory upheld by Henoch and Baginsky that the trouble lies in failure to absorb lime salts lacks confirmation, because observations of their elimination in the urine of rachitic and normal subjects show no difference. It has been further held by Pummer that, although sufficient lime may be fed and absorbed, it may not be deposited in the neoplastic substance on account of diminished alkalinity of the blood, but it has been shown by Stoeltzner that the alkalinity of the blood is not diminished in rickets.

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[1] American Journal of the Medical Sciences, March, 1904.

[2] Archives of Pediatrics, April, 1904.

The lesions of rickets have also been attributed to the presence of lactic acid in the system or, as is held by Monti, an excess of lactic acid in the stomach with a lessened amount of hydrochloric acid. This lactic acid theory may appeal to us because of the fact that many of the foods which seem to produce a severe type of rickets contain starch which may produce lactic acid in the stomach, and, also, on account of the large content of lactic acid bacteria in some market milk. Extensive experiments on animals, consisting in the injection of lactic acid, have failed almost always to produce rickets. Spellman injected a rabbit a month and a half with 10 c.c. of a 1:200 solution of lactic acid without producing any bone lesions.

On the other hand, rickets occurs in animals on a diet which does not lead to the development of lactic acid. Guerin fed young animals on meat instead of mothers' milk, and they developed rickets. In the London Zoological Gardens more than twenty litters of lion cubs, which had always been fed on meat, were lost from the development of rickets. At last one litter with advanced rickets was seen by Bland Sutton, who advised for them milk, powdered bone, and cod-liver oil with meat. They were left in the same environment, but in three months they showed no signs of rickets. These animals were therefore dying from rickets on a diet of proteid, only of a sort rather difficult of digestion, and were cured by a diet of more digestible proteid with fat.

This leads to the inquiry whether the absence of fat in the food may not be an important factor in the production of rickets. Clinical experience has convinced many that much of the severe rickets is produced by feeding with proprietary foods and condensed milk, both of which are very poor in fat. Thus, while mothers' milk usually contains as much as 3 to 4 per cent. of fat and two to three times as much fat as proteid, we find in the ordinary condensed milk less fat than proteid, and in the pulverized proprietary foods from one-fourth to one-fourteenth as much fat as proteid. Experiments were undertaken by Herter, of New York, to produce rickets in pigs by fat starvation. One pig was fed fifty-one weeks on a limited quantity of Walker-Gordon skimmed milk, containing $\frac{1}{40}$ per cent. fat, while sows' milk usually contains 8 to 10 per cent. fat. The pig, therefore, received only $\frac{1}{300}$ to $\frac{1}{400}$ the normal amount of fat. During the fifty-one weeks the pig gained sixteen pounds. It, however, became constipated and weak; its skin became dry, and it was drowsy. It was moribund when killed. Another pig was fed twenty weeks on an unlimited supply of the same food. It also developed muscular weakness and drowsiness. A third pig was fed fifty-six weeks with skim milk and carbohydrates. This pig developed the muscular weakness and had occasional diarrhœa. Other pigs were also used. As a result of the experiments and autopsies on the pigs, Herter concluded that fat starvation in pigs does not cause rickets. No rickety lesions in the bones of these pigs were evident.

The most peculiar discovery at the autopsies of these animals was the presence of mucoid degeneration, which replaced the fat of the adipose tissue. This mucoid degeneration did not, however, occur in the animals that received an excess of carbohydrates. It thus seems fortunate that these canned foods for babies contain usually an excess of carbohydrates, since by analogy this fact may have saved the babies fed on them from a mucoid degeneration of their adipose tissue, although subjecting them to fat starvation. It was asserted by Delcourt, in 1899, that the lesions of rickets could be produced in animals by the action of phosphate of potash, and that he had produced them by the use of phosphate of potash in dogs. Spellman repeats his experiments. He gave to seven rabbits for a month daily doses of 2 to 5 grains of phosphate of potash. To a young pig he gave 700 grams of phosphate of potash in twenty days. To a rabbit one month old he gave for several days subcutaneous injections of 5 to 50 c.c. of a 5 per cent. solution of phosphate of potash. All the animals were killed, and showed no macroscopic or microscopic evidence of rickets.

Although Spellman failed in obtaining positive results, he believed the lesion to be due to some irritation, and thought it most likely that such irritation had its origin in the gastrointestinal tract. In order to determine whether intestinal poisons would cause the lesions of rickets, he made repeated injections into twenty rabbits and one cat of extracts of stools of rachitic infants, and in only one of these animals, a rabbit, did he obtain evidence of rickets. Experiments in feeding animals on the colon bacilli, and others in injecting their toxins, also failed to produce rachitic lesions. The inoculation of cultures of the staphylococcus and in other experiments of their toxins gave negative results. The toxins of the bacillus pyocyaneus gave a like negative result. Morpurgo, however, states that by injecting into young rats a pathogenic diplococcus he obtained typical rickets. Efforts made by Spellman to isolate a specific etiological organism from the intestine of rachitic infants also proved unproductive.

The theory that intestinal toxæmia is the cause of rickets is opposed by Kassowitz, who calls attention to the fact that intestinal toxæmias are summer disorders, rickets a disease of winter. In like manner the bone of rachitic infants has been found to contain the same organisms as the bone of non-rachitic children. The inoculation into healthy animals of bones removed from rachitic infants have in 5 cases given negative results. Notwithstanding his 126 failures and 1 positive result, Spellman is not discouraged and is still continuing his investigations.

It may be remembered in considering all this experimental work that one positive result is of the greatest value; while negative results, though of value for reference in future experiments, should not produce much influence on our opinions, we should especially not apply to children any deductions from experiments on animals, which gave negative results. This statement is well supported by experiments of Spellman, in which he subjected various animals to the combination of the conditions we believe to produce rickets in babies: poor air, poor light, defective forms of food, etc. All died from gastroenteric disorders in from one to four months, but not one showed any sign of rickets.

If, then, we review the positive result of these experiments we must reject those of Delcourt, in which phosphate of potash was administered, since they lack confirmation, although repeated by Spellman. Morpurgo obtained positive results in rats from the injection of a pathogenic diplococcus. There is, however, no confirmation of this observation. Spellman in one experiment obtained rachitis from the injection of extracts of the diarrhœal stools of rachitic children. Bland Sutton found that young monkeys deprived of mothers' milk and fed on vegetables and fruit became rickety. Two young bears fed on rice biscuits and raw meat had extreme rickets.

Freeman reports some carefully made observations, the results of which are shown in the following table:

INDICATIONS OF RACHITIS IN THREE GROUPS OF BABIES.

	No.	Average age.	Sweating.	Bald spot on head.	Rosary.	Pot belly.	Small thorax, large abdomen.	Delay'd dentition.	Craniotabes.
TENEMENT HOUSE.									
Bottle-fed	13	4½ mos.	0 %	77 %	70 %	46 %	23 %	....	8 %
HOSPITAL.									
Breast and condensed milk	66	8 mos.	35 %	76 %	91 %	57 %	42 %	16 %	45 %
Modified milk	25	10 "	20 %	56 %	88 %	44 %	32 %	50 %	12 %

A study of these statistics shows the peculiar fact that the tenement-house children make a much better showing than those in hospitals, even when the hospital babies are for the most part breast fed, and here we have data apparently at variance with the accepted ideas. In one group of hospital babies we have ample light, good air, cleanly surroundings, and mostly breast milk, with 90 per cent. rosaries. We cannot then agree with Morse, who examined for rickets 318 dispensary babies in Boston, and concluded, after a careful study of the nationality and food, that they had only one influence in common, and that was unhygienic surroundings. Freeman concludes his study with the statement that experiments on animals would seem to indicate that unsuitable food is capable of producing rickets, and that possibly certain bacteria or intestinal toxins may produce a similar result. The clinical observations are too limited for any positive deductions, but are interesting inasmuch as they indicate less rachitis in the tenement house than in institution children fed on modified milk, and the greatest amount of rachitis in institution babies fed on breast milk with auxiliary feedings of condensed milk. In discussing Freeman's work Shaw, of Albany, referred to the work of Monti, who found that in nearly every case there was a previous history of some stomach disorder. Examination of the stomach contents showed an increased amount of lactic acid and a diminished amount of hydrochloric acid. His theory was not that the lactic acid produced rachitic changes, but that they were influenced by the diminution of the hydrochloric acid. Zweifel lays much stress on the diminished amount of hydrochloric acid in the stomachs of these cases. He showed that the amount of hydrochloric acid is dependent on the amount of sodium chloride ingested, and that the nursing mothers in Saxony receive very little salt in their food; hence, their nursing babies frequently show signs of rickets. He comes to practically the same conclusion as Monti, through a different course of reasoning.

The heredity of rickets is believed in strongly by F. Siegert.[1] He holds that hereditary tendency is one of the most important factors in the causation of rickets, the disease being transmitted commonly through the mother. Other important causes he believes to be disease of the digestive and respiratory organs.

Nathan,[2] of New York, also considers the etiology of rickets and reviews the various theories that have been advanced, basing his paper on the records of 803 cases. Many of them, however, were seen but once or twice. He tabulated 477 cases with reference to treatment. A remarkable uniformity of results is shown in the three classes of cases treated by monocalcic phosphates, cod-liver oil, and phosphorus. These tables would seem to show, in fact, that the medicinal treatment had little or no influence on the course of the disease. From these studies Nathan believes that we must conclude that a deficiency in the quantity or a faulty absorption of the calcium ingested is not the cause of rachitis. Such being the case, and our only clue to the etiology of the disease being the faulty deposition of lime salts in the bones, the assumption that an abnormality of metabolism, which, besides causing other abnormalities, is inimical to the normal calcification of the bones, must form the starting point of our search for the cause of rachitis. How such an anomaly is induced is difficult of explanation. Moreover, it will remain difficult or impossible to explain until we have a better understanding of the nature of the anomaly than we have at present. In this respect we are, as Vierordt aptly remarks, still completely in the dark.

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[1] Jahrbuch für Kinderheilkunde, December, 1903.

[2] Medical News, February 27, 1904.

After all the study that has been given to this subject we must unfortunately conclude that this final statement most clearly expresses the conditions. The evidence of various series of statistics is so conflicting that we are forced to conclude that we have not yet discovered the ultimate cause of rickets, and are still in the dark regarding its true nature.

Clinical observations of rickets have been so carefully and extensively made that it would seem that there is but little more to discover. However, Jacob Sobel[1] asserts that radiographs show enlargement of the phalanges in rickets. The thickening occurs at the middle of the shaft and not at the ends of the bones, so that each bone is spindle-shaped. While Sobel is not the first to call attention to the rachitic changes of the bones of the hands and feet, his description, so far as I know, is the most complete that has appeared.

A case of marked diastasis of the recti muscles in rickets is reported by Francine.[2] This condition is another which has received little if any attention from medical authors. The responsibility for diastasis of the recti muscles in rickets rests, primarily, upon developmental lack of tonicity on the part of the muscular system. It shows itself in weakness of the abdominal walls and in dilatation of the stomach and gut; and is, secondarily, induced by the associated tympanites of gastro-intestinal fermentation. The pot-belly and the diastasis are thus the result of gaseous distention of the stomach and colon, acting upon relaxed and weakened abdominal walls.

The origin of craniotabes has been carefully studied by Rasumoffsky.[3]

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[1] Medical News, February 13, 1904.

[2] Archives of Pediatrics, February, 1904.

[3] Ruskii Vratsch, vol. iii., No. 5; Archives of Pediatrics, May, 1904.

His work is based on the microscopic study of twenty-one infantile bodies. He concludes that there are two kinds of cranial softening in children, the rachitic and the non-rachitic, the latter being due to atrophy or undeveloped structure of the bones, while the former is produced by lack of lime salts in conjunction with the pressure of the brain on the tender bone. The rachitic changes are seen most frequently after three months, while the atrophic changes may begin even during intrauterine life. Rachitic softening of the skull can be recognized on the living child only in the presence of the characteristic rosary on the thorax. Atrophic craniotabes may be due to syphilis, and in such cases must be looked upon as congenital. The microscopic pictures of the rachitic and the non-rachitic craniotabes are widely different.

Chondrodystrophia Fœtalis. The pathology of this condition was considered in these pages two years ago.[1] A very excellent article upon the subject is contributed by Nathan.[2] His description of the clinical characteristics is particularly interesting. The lower extremities are always too short, being entirely out of proportion to the length of the trunk. This causes a decentralization of the body, and tends to give these cases a very characteristic and at times a very ludicrous appearance. It readily distinguishes them from other dwarfs; for in cretinism, or in the so-called idiopathic dwarfism, the extremities and the trunk are both shortened and not out of proportion. The upper extremities are also too short; they do not, as in the normal individual, reach to the hips. The fingers and toes are too short, and, in fact, the conditions found in the living subject are exactly what the pathological anatomy would lead us to expect. During early life these individuals are obese, and the natural skin folds are exaggerated, but as they grow older the obesity gradually disappears. The mental faculties are always intact; these children are not sluggish and somnolent, but bright, taking an intense interest in their surroundings and learning to talk as readily as other children. If the older individuals are backward in their studies, it is more because they are apt to be kept from school because of their small size and peculiar appearance than from lack of intelligence. They begin to walk late, as a rule, and those cases with complicating osteoporosis do not do so for a long time; but when they have learned to walk their gait is no way peculiar or unsteady.

Infantile Scurvy. Although numerous cases of infantile scurvy have been reported, but little that is really new has been added to our knowledge. J. L. Morse[3] calls particular attention to the fact that *hæma-*

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[1] PROGRESSIVE MEDICINE, March, 1903, p. 267.

[2] American Journal of the Medical Sciences, April, 1904.

[3] New York Medical Journal, August 14, 1904.

turia is not an uncommon symptom. In some cases it is, in fact, the earliest and even the only symptom for a time. Scurvy, he believes, is the most common cause of uncomplicated hæmaturia in children. Neter[1] also asserts that hæmaturia may for a time be the only symptom of scurvy in infants. The child may be fretful, but definite symptoms may not otherwise be present. Still[2] also speaks of hæmaturia as a symptom. It is a part of the general tendency to hemorrhage shown in the disease. Slight albuminuria even without blood may also occur. He asserts, however, that true nephritis is not uncommon.

The treatment of scurvy is particularly considered by Cheney.[3] It is a disease in which proper treatment works a miracle. It has no tendency to spontaneous recovery; but when recognized and given proper care improvement is immediate and recovery surprisingly rapid. No other disease affords a physician a better prospect for brilliant results; although the treatment advised by Cheney is not new, but is what has been advised by all authorities of experience, it cannot be too often repeated. Three measures are indicated, and are sufficient for the cure of any case: (1) Discontinue the proprietary food. Substitute for it a mixture of fresh milk diluted with water or with oatmeal water. (2) Give fresh orange-juice in dose of one to three teaspoonfuls three times a day. It is surprising how babies with scurvy take to this and seem to enjoy it. (3) Give freshly expressed beef-juice, squeezed from rare steak, in dose of from one to two teaspoonfuls three times a day. Give no medicine at all.

Marasmus. This condition, frequently known as athrepsia, infantile atrophy, or simple wasting, is a very important one to the pediatric practitioner. It is a vice of nutrition and is defined by Holt as an extreme form of malnutrition seen in infancy, occurring, so far as is known, without constitutional or local organic disease. In its more marked forms it is not often seen in private practice, and is rare in the country. Cases of malnutrition, however, of a less serious type are very common in private practice, both in the city and in the country. It is of frequent occurrence in dispensary practice, and may be seen in every institution for infants. It is an immediate result of hospitalism. It is the determining factor in the fatal result in a large number of cases. Some other disease, however, such as diarrhœa or pneumonia, is usually the immediate cause of death, and is, therefore, usually so accredited. It is due in the vast majority of cases to two causes: improper food and unfavorable surroundings. The two conditions are usually combined. The feeding may be very faulty, but if the child is in healthy surroundings in the country where it receives plenty of pure air it is rarely the victim of marasmus. On the other hand, breast-fed infants even in the most unfavorable surroundings rarely show serious signs of malnutrition. But combine bad food with bad surroundings and wasting is very prone to follow. If added to these factors there is inherited constitutional weakness we have the conditions best suited to produce atrophy. "The odds are so against an infant that its feeble spark of vitality flickers for a few months and gradually goes out."

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[1] Deutsche medizin. Wochenschrift, May 5, 1904.

[2] Lancet, August 13, 1904.

[3] Medical News, June 4, 1904.

Holt has drawn special attention to the frequency of marasmus in overcrowded institutions. It is the experience of every hospital physician that artificial feeding, even if the methods are approved and perfect, is especially difficult in hospitals and institutions. The children in such institutions gradually waste and lose weight and succumb to the mildest of acute maladies. It cannot be too strongly stated that children should be kept in hospitals as short a time as possible. As soon as their acute illness is passed they should be removed from the hospital. They will frequently convalesce more satisfactorily in tenement houses than they will in the hospital wards. The error is made in most hospitals of placing too many children in one ward. It is a common impression that because children are small they do not require the air space that adults require. The contrary is the fact. Children require more air space than do adults. One thousand cubic feet for each patient should be the minimum, and more than this is desirable.

An interesting study of the relation of the *thymus gland* to marasmus was recently made by J. Ruhräh.[1] He states that the most characteristic lesion of marasmus, except the wasting of fat and muscles, is not mentioned in any of the text-books on the diseases of children. This is a wasting of the thymus gland. There are two conditions in which there is atrophy in infants: the primary cases in which the cause is as yet unknown, and those that follow definite pathological conditions, or the secondary cases. The dividing line cannot at this time be definitely drawn. For the present he thinks the cases should be divided on a pathological basis into those where there are lesions of definite diseases, and those where there are no special and constant lesions, except the wasting of the muscles and the body fat, and, as he now points out, of the thymus gland as well. It is known that the thymus gland bears some relation to the state of nutrition of the body, but its exact relation to the assimilation is not yet understood. In the eighteen cases observed by Ruhräh atrophy of the thymus was the only distinctive lesion found at the autopsy. He asserts that microscopic observations of the thymus will clearly indicate the state of the child's nutrition. In normal infants the structure of the thymus is unaltered; in moderate atrophy the cortex and medulla are not easily distinguished, while in severe atrophies the other changes mentioned above are clearly seen.

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[1] British Medical Journal, August 29, 1903

It is well known that malnutrition is closely associated with tuberculosis and results from it; while, on the other hand, malnutrition predisposes to tuberculosis. Fischer[1] reports a study of 5000 cases in children of the poorer classes, made chiefly to determine the relation of malnutrition to tuberculosis. He found that some degree of malnutrition almost invariably preceded tuberculous infection. The influence of the administration of chloride of sodium upon the weight of nursing infants has been investigated by Nobecourt and Vitry.[2] They conclude that the addition of salt to the diet of infants who are under weight is of considerable value. It is also valuable for premature infants and those of a marasmic tendency. They advise the use of 1 cgm. for each 100 gm. of body weight.

Infant Feeding. BREAST FEEDING. Some interesting observations made on 1000 children are reported by Hubert Armstrong.[3] These children were all inmates of the Liverpool Infirmary for Children, and were divided into three classes. Deaths during the first day of life were not included, and the statistics were based upon the rate per 1000: (1) Wholly breast-fed up to six months or over, 689 cases—deaths, 84.14. (2) Breast-fed to the same age with the addition of cows' milk or various foods, 127 cases—deaths, 133.86. (3) Entirely hand-reared, 184 cases—deaths, 228.26. These statistics were those of the first year of life, and teach a lesson which requires little comment.

During the last three years Chapin has written largely upon the function of the milk of each animal in developing the stomach for the food it is to take in later life. He has contributed another excellent article[4] touching upon this subject. It considers particularly the influence of breast-feeding on the infant's development. When the doctors, the nurses, and the mothers come to realize that nature does not intend a child to take anything except breast-milk as food until its digestive tract is completely formed, and that maternal milk helps in the formation of a strong and vigorous stomach, there will be less trouble with artificial feeding. Careful feeding will commence at once, and the start will be made with a fairly well child and not with one that is suffering from a perversion of the digestive apparatus. The mothers will be taught that a food that "agrees" is not necessarily the proper one for continued use, and that the change to something else may have a useful

[1] American Medicine, June 11, 1904.

[2] Revue mens. des malad. de l'enf., March, 1904.

[3] British Journal of Children's Diseases, March, 1904.

[4] Archives of Pediatrics, August, 1904.

purpose, and that in the art of feeding there are other problems than mere gain in weight to be considered.

Poor nutrition paves the way for sickness. The breast-fed infant is not as susceptible to disease as the artificially fed baby, and when attacked recovers more promptly, as it has more vitality and reserve force. Condensed-milk babies proverbially succumb to any serious illness, and when the small amount of proteid in highly diluted condensed milk is considered it is surprising that any other result could be expected, as the infant has in this food little from which a strong, vigorous body can be constructed. Too much attention has been paid in the past to gain in weight, and too little to the character of the flesh. Of two animals of the same weight one may be a little dwarf, enclosed in a mass of dropsical fatty tissue, while the other may be a giant in comparison, when the amount of blood and size and strength of the vital organs are determined in both. This difference is due to feeding too little proteid to the dwarfed animal. From a nutritive standpoint alone, the breast-fed infant has a great advantage over the bottle baby, but it has other things greatly in its favor also. Mothers' milk is more than food as we think of food for adults; it is a food that adapts itself to the infant's developing digestive tract.

The form which the mother's milk assumes after it reaches the stomach depends upon the state of the development of the stomach. In the early stage of lactation the secretion of the stomach is the rennet ferment which changes the casein of the milk to a soft solid mass or curd which is not digestible by pepsin. The character of this mass or curd differs with the kind of milk. When the stomach secretes hydrochloric acid it combines with the curd and forms chloride of paracasein, a compound much denser than rennet curd or paracasein. This compound of curd and acid is readily digested by pepsin, and gastric digestion commences. As fast as the secretion of pepsin and acid increases in quantity and strength the mother's milk is ready to use it up, and we find as the child grows older and its stomach increases in size and becomes stronger that it takes longer for it to empty, and that the feeding intervals must be made greater. An artificially fed baby is a premature child from a physiological standpoint, and anything but maternal milk is foreign to its digestive tract. Chemical analyses of foods will not show all their defects or advantages; these are often brought to light only by a study of physiology and pathology. The reason for so much difficulty in feeding cows' milk to infants is that digestion in the calf is different from infantile digestion. Cows' milk is physiologically adapted to a calf's digestion; human milk to the infant's stomach.

Artificial food for an infant should contain as much nutriment as breast-milk; it should be as digestible, and it should adapt itself to the developing digestive tract. Milk of some kind must be the foundation of food that is to be the regular diet, as its casein is the only form of proteid that will change its character with the change of digestive secretions. As the stomachs of mammals differ, so their milks differ, and there can be no scientific infant feeding unless this fact is kept in mind.

Many children are taken from the breast without adequate cause. The mere fact that a child is not thriving at the breast is not sufficient reason for weaning it. Many a child is weaned without any investigation as to the frequency or regularity of nursing or the health and habits of the life of the mother. Northridge[1] discusses many of these questions, and from his own experience is convinced that attention and earnest effort would result in many mothers nursing their babies who had believed themselves unable to do so. That a mother is nervous, or subject to fits of anger, or is unhappy, or does not wish to nurse her baby, is not adequate reason for weaning. If a mother insists on weaning her child against the advice of the physician she should be made to fully understand that the responsibility is her own. Many physical conditions, like fissure of the nipple or painful breasts, should not be considered as valid reasons for weaning. Greater care on the part of physicians in explanation to the mother would result in the breast nursing of many babies who are artificially fed.

Artificial Feeding. A noticeable feature of much that has been written during the last three or four years is the growing appreciation that all infants cannot be fed according to one scale or table or by one method. Study of the individual child is insisted upon as a requisite of successful feeding. This is the ground taken by Rotch[2] in one of the best articles which appeared during the past year. He insists that infants cannot be fed by rule of thumb. We can only lay down the general principles governing the milk supply and subsequent modification of the milk and finally, its adaptation to the individual infant.

Each infant must be studied by itself. The most successful feeder of infants will be the man who is best acquainted with the many resources in our modern methods of percentage feeding, and who can appreciate the individual needs of the especial infant.

One of the most notable recent investigations made upon infant feeding is that of Park and Holt,[3] a preliminary report of which I referred to last year This report is based upon investigations carried on for more than two years by physicians connected with the Rockefeller Institute for Medical Research, the New York Department of Health, the Carnegie Laboratory, and the Good Samaritan Dispensary, into the feeding of cows' milk to healthy infants in tenement houses. For comparison, however, a number of institutions are included. These observations, excluding imperfect cases, were made upon 632 babies. This report is well summarized in an editorial article in a subsequent number of the same journal.[1] It makes special note of the fact that no special varieties of bacteria were found in untreated milk which seemed to have any special causative importance. The varieties of bacteria found in raw milk were many, but they did not seem pathogenic. Cases of indigestion were observed where Pasteurized milk more than thirty-six hours old was used, and the bacteria were found to be numerous, mostly of the spore-bearing varieties. The observers were confronted with two facts that limited the field of investigation. The first was the unexpected difficulty in finding fewer bottle-fed babies than the physicians connected with the hospitals and dispensaries had expected to see, and the second, that the proprietary foods were not in general use in tenement houses. The clinical investigations were carried on with the following forms of milk: condensed milk, store milk, bottled milk, milk from Pasteurizing establishments, and boiled milk from a dispensary

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[1] Brooklyn Medical Journal, January, 1904.

[2] Archives of Pediatrics, August, 1904.

[3] Ibid., December, 1903

The bad results from the use of condensed milk were most apparent. Two cases out of 48 died during the winter; 14 out of 70 cases died during the summer. This was a worse showing than that made by the "store milk." In this series were 55 children without any mortality in the winter, and 79 children in the summer with a mortality of 15. More cases did badly on "store milk" in the summer than on condensed milk, although this difference was not striking. It was noted that babies fed on condensed milk succumbed rapidly to the disease. Pasteurized and bottled milk from the milk depots and dispensaries gave good results. Fifty cases received this milk in winter without a death. In summer 145 cases, showed a mortality of 4. A limited supervision was exercised in these cases, as the mothers reported at the dispensaries, and were furnished milk in separate bottles suitable for each feeding. When bottled milk was used the results were not satisfactory. The milk was classed as "good bottled milk" and "best bottled milk." Sixty-eight babies were fed on the former in the winter and 3 died; 6 babies were given the best milk in the winter and 12 in the summer without a death. These latter figures were, however, too few for accurate comparison. Comparison was made between a group of babies fed on Pasteurized milk and a group fed on a fair grade of raw milk, both kinds being distributed from a central station. It was observed that the raw milk seemed to cause more illness, and the duration of diarrhœa was three times as long as when the Pasteurized milk was given. The bacteria in the raw milk averaged in the morning count 1,200,000 per c.c., and in the Pasteurized 1000 per c.c. The cheap milk Pasteurized showed a high bacterial count, and gave the worst results. Its use was followed by diarrhœal diseases and a great many deaths. The so-called "good milk" was not of the high grade of the "best milk." This good bottled milk was not as successful as it was expected it would be. An interesting fact is shown in the figures for the breast-fed babies, who numbered 31 in the summer series, without a death. In the table of summer cases were 217 infants under six months, with a mortality of 13 per cent; 191 were between six and twelve months, with a mortality of 8 per cent. A total of 50 cases of diarrhœa were observed in the three months of June, July, and August, with 9 deaths. Not one of these were entirely breast-fed. The authors in summarizing this work draw the following conclusion relative to the immediate effect of the milk: It was observed that during the cool months the morbidity and mortality were not appreciably affected by any kind of milk nor by the number of bacteria. In summer, however, the influence of poor milk, particularly condensed milk and that from stores, was decided in causing illness and death. The number of bacteria which may accumulate before milk is harmful differs with the character of the bacteria present, the age of the milk, and the temperature at which it is kept. When milk had been kept cool the injurious effect of bacteria was found to be less with every month over one year of age. With milk of average quality it was observed that during the warm weather those infants that were fed with milk that had been previously treated did better than those infants who had raw milk. Fresh, clean milk in sealed bottles and milk from central stations where there was a constant oversight gave the best results. The latter method of feeding is urged as being less expensive and under a closer surveillance than the former, and, therefore, better fitted for the average tenement-house mother. Most important of all is the plain statement that breast feeding should be encouraged by every means and not discontinued without good and sufficient reasons. The comparatively few cases of illness among the nursing babies recorded bear out this physiological truth.

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[1] Archives of Pediatrics, March, 1904.

In an article on the limitations of chemistry in infant feeding Chapin[1] shows that chemistry has limitations in actual feeding, though he does not disparage the chemical analysis of foods. He asserts that if the whole basis of infant feeding should be chemical, then the principles taught would be frequently wrong, as it is now known that some of these principles have been erroneous. Cows' milk and human milk have been analyzed many times, but the advances in infant feeding have come, not so much from these analyses, as from clinical and physiological experiments with cows' milk altered or modified in other ways than simple qualitative adjustment of the component parts. The advances made have been greater along the line of physiological adaptations of various milks to the feeding requirements than from exclusive chemical studies. If chemical composition alone is to be considered, cellulose (paper), $C_6H_{10}O_5$, should be as good a food as starch, $C_6H_{10}O_5$; cane-sugar, $C_{12}H_{22}O_{11}$, always interchangeable with milk-sugar, $C_{12}H_{22}O_{11}$; and all caseins should act exactly alike. Jordan well states the problem when he says: "A ration may be chemically right, but practically wrong; but, at the same time, it is worth much to the feeder to be sure that the nutrients which he supplies to his animals will meet their physiological needs." This principle applies to infants as well as to the lower animals.

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[1] New York Medical Journal, April 23, 1904.

Several writers during recent months have presented systems of infant feeding. At least a dozen such methods have been published within a few years. It seems unnecessary to reproduce any of these this year. Last year I gave in considerable detail[1] a method for milk modification which seems to me one of the simplest and most practical that has been devised. A simple method of considerable merit for modifying milk for tenement-house practice is given by Coolidge.[2]

A few years ago a great effort was made to secure methods of modification which would enable changes to be made of very minute fractions of 1 per cent. This has been abandoned as unnecessary. Such minute changes are rarely necessary, and in home modification, unless the strength of the milk is determined every day, considerable variation will occur by the use of the same formula. Some careful investigations were made by Edsall and Fife[3] to determine the accuracy of percentage modification. They conclude that milk modifications under the best of conditions will often vary 0.2 per cent., occasionally 0.3 per cent. from the prescribed formula, with modifications of medium strength. With low modifications the error will be correspondingly less, and with high modifications correspondingly somewhat higher. Home modifications are, within the limits just mentioned, trustworthy, if they are made by a clear-headed and careful person, from milks and creams of a chemical composition that is known to be reliable.

Unless the composition of the milk and cream is known, or if one cannot be sure that the modifier is careful, home modifications are liable to vary greatly from the formula prescribed. Laboratory modifications appear from the author's figures to be satisfactorily accurate. Unless the milk and cream as well as the person doing the modifying at home, can be fully trusted, laboratory modifications, when available, are much more reliable than home modifications.

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[1] PROGRESSIVE MEDICINE, March, 1904, p. 232.

[2] Archives of Pediatrics, August, 1904.

[3] New York Medical Journal, January 16, 1904

The most satisfactory method of having milk modifications prepared is to have a thoroughly capable person make them at home from milk and cream of reliable composition. In this case the whole process can be kept under direct supervision. To trust the modifying to a readily confused mother, trained nurse, or nursery governess, or to most nurse maids would make the results very doubtful. The writers confess that their analyses, while not lessening their faith in mothers and nurses, do make them somewhat doubtful of their accuracy in making milk mixtures. The analyses of their modifications demonstrate how important it is, in having home modifications made, to have all the small details and, above all, the amounts of the different ingredients carefully written out or filled out on printed blanks, in order to guard as far as possible against confusion. Nothing should be left to the modifier's judgment or memory.

It is careless practice to order a certain formula for an infant, and to take it for granted that this formula is actually being taken by a child. It is, of course, difficult for those in general practice, if they have not the small facilities necessary for doing such work, to determine the fat content of the different milk mixtures that are actually being given to infants under their charge. It would, however, be very easy for many such physicians to have this done by an assistant. Those who are especially interested in pediatric practice can hardly show proper interest in their work unless they often do this or have it done. Simple centrifugal estimates of the fat are certainly quite sufficient for clinical purposes, as an indication of the accuracy of the mixtures, though an occasional proteid estimation, if one has the facilities for it, would add to the effect. At the same time it would give one constant knowledge as to their accuracy in any individual case. The apparatus required is cheaper than that used for ordinary examinations of the blood; the method requires less time, and it gives good results. It is already occasionally used by some physicians, but is not often employed by any considerable number of them.

Among the more unusual suggestions for infant feeding recently made is the use of coagulated cows' milk. In 1900 Dungern described a method of breaking up the casein into fine coagula by means of a rennet ferment. Such milk in laboratory experiments is very easy of digestion. In practical use the milk is coagulated to the consistency of jelly when it is broken up so fine as to pass through an ordinary rubber nipple.

Plain milk can only be used, as Pasteurized or diluted milk will not coagulate. Oppler[1] reports observations upon the use of this milk. It gave satisfactory results in many cases of habitual vomiting. Oppler also approves of its use in gastrointestinal disease or when the digestion has been disturbed by a too exclusively starch diet. He disapproves of its use during the first month or two of life, and among children that have been overfed. He advises against its employment for more than a few weeks at a time.

The ability of the infantile intestine to absorb fats was investigated by Noblecourt.[2] He found that if but little fat be given it may all be absorbed, while the larger quantity may be only partially absorbed. Breast-fed infants in good condition have a marked ability to digest and absorb fats. This ability, however, is rapidly and decidedly impaired in weak anæmic infants, and in those ill from any of the acute diseases, particularly of the pulmonary and intestinal systems. The system of measurement used by the author consisted in carefully estimating the amount of fat taken with the food, and the amount excreted by the bowel.

Some observations on the starch digestion in infancy are reported by Shaw.[3] The infants were all under two months of age and the observations were made with much care. The results would seem to demonstrate that the saliva of very young infants contains a diastatic enzyme capable of converting small quantities of starch into maltose; that the diastatic action of the saliva may continue in the stomach as long as two hours after feeding; that on physiological grounds there is no reason why infants cannot digest small amounts of starch.

An extended article upon the artificial feeding of infants is contributed by Pisek.[4] It is written in a somewhat elementary manner and is a synopsis of a course of lectures delivered before a nurses' training school. For the purpose it was designed to fulfil it is an admirable article, and well adapted for the instruction of those who have but slight knowledge of the subject.

Feeding of Children After the First Year. The beginning of the second year is a very important period. While most children are watched carefully during the first year as to their growth, feeding, and management, they are apt to be neglected during the second year. The diet is often changed with too much suddenness, and the careful hygienic measures of the first year are frequently neglected. The dangers of infection suddenly and rapidly increase as the child's powers of locomotion develop.

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[1] Monat. für Kinderheilkunde, January, 1904.

[2] Revue mens. des malad. de l'enf., August, 1904.

[3] Albany Medical Annals, January, 1904.

[4] Trained Nurse, May and June, 1904.

During the first year the child is kept within narrow bounds, usually in clean beds or carriages. All this changes as the child begins to run about, and the hygienic care is often relaxed. The child, at the beginning of the second year, should be able to stand and walk beside a chair, should measure about twenty-nine inches in length, should weigh about twenty pounds, should have six incisors, and should have a stomach capacity of about twelve ounces. This is followed during childhood by an annual growth in length of about three inches each year, and a gain in weight of about five pounds each year. These amounts are a little larger for the second than for subsequent years. We thus reach a period at about the sixth year when the length in inches and the weight in pounds should be equal.

These matters are considered by Freeman[1] in an admirable paper on the feeding and care of children after the first year. He believes that most children after the first year are fed too often and on too great a variety of food. He believes, also, that they receive too little milk. The first food to be added to the milk diet should be one of the cereals. Of these, particularly oatmeal may be given in the form of a thick, strained gruel. A half-ounce of orange-juice may be given daily even before the end of the first year. A soft-boiled egg may be given by the end of the fifteenth month, and four ounces of clear soup of beef, mutton, or chicken may be given soon after. He does not use beef-juice, but begins to give a little meat by the twenty-first month.

During the second year a child should be fed five times a day; the diet at the beginning including only milk, gruel, and orange-juice, to which later may be added bread, soup, bread and butter, and at the end of the year meat. Beef-juice should only be used as a tonic. Three meals should be given during the third year, with an extra bottle of milk at 10 A.M.; the articles of food being continued with the addition of certain vegetables and simple desserts. After the third year but three meals a day should be given, including the same articles of food, and throughout childhood about one quart of milk should be taken daily. The evening meal should consist only of cereal and milk and bread and butter. Both the variety and amount of food should be carefully restricted. During the second year children should sleep twelve hours at night and have a morning and afternoon nap each day, and throughout childhood should continue to sleep twelve hours at night with one nap during the day. The dietary advised by Freeman after the first year is well shown by the accompanying tables:

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[1] Archives of Pediatrics, June, 1904.

DIET OF THE SECOND YEAR.

	6 A.M.	10 A.M.	1 P.M.	5 P.M.	9 P.M.
At 12 mos.	8–10 oz. milk.	8–10 oz. milk.	4 oz. gruel. 8 oz. milk. ½ oz. orange-juice.	8–10 oz. milk.	8–10 oz. milk.
At 15 mos.	8 oz. milk. 6 oz. gruel.	8 oz. milk.	Soft-boiled egg. 8 oz. milk. ½ oz orange-juice.	8 oz. milk. 6 oz. gruel.	8 oz. mik.
At 18 mos.	8 oz. milk. 6 oz. gruel.	8 oz. milk.	4 oz. clear soup. Soft-boiled egg. 8 oz. milk. ½ oz. orange-juice. Bread and butter.	8 oz. milk. 6 oz. gruel.	8 oz. mik.
At 21 mos.	8 oz. milk. 6 oz. gruel. Soft-boiled egg. Bread and butter.	8 oz. milk.	6 oz. clear soup. ½–1 oz. scraped beef. ½ oz. orange-juice. Bread and butter.	8 oz. milk. 6 oz. gruel. Bread and butter.	8 oz. mik.

DIET OF THE THIRD YEAR.

6 A.M.	10 A.M.	1 P.M.	5.30 P.M.
Orange-juice. 10 oz. milk. 6 oz. gruel. Soft-boiled egg. Bread and butter.	8 oz. milk.	6 oz. soup. Meat. Bread and butter. Vegetables. Dessert.	10 oz. milk. 6 oz. gruel. Bread and butter.

DIET AFTER THE THIRD YEAR.

BREAKFAST, 7–8 A.M.	DINNER, 12–1 P.M.	SUPPER, 6 P.M.
Fruit. Cereal. Milk. Bread and butter. One or two eggs.	Soup. Meat. Bread and butter. Vegetables. Dessert.	Cereal. Milk. Bread and butter.

Infant Foods. The most important artificial food for infants and the first to be considered is cows' milk. This fact has been so well established and is so universally accepted that arguments upon the subject are no longer required. For several years, in fact, pediatric writers have taken this for granted, and but little is said by them upon the subject. As this fact became more clearly established, the importance of securing clean and wholesome milk became more and more apparent. During the past decade, therefore, there has been an active campaign waged toward obtaining clean, pure, and safe milk. This campaign was originated and has been largely carried on by the medical profession. It is true that many dairymen have been found not only willing but anxious to do their part in this excellent work; but as dairymen are almost without exception ignorant of bacteriology and chemistry and lacking also as to knowledge of the evil effects of contaminated milk, it was necessary for some one possessing this knowledge to take the lead in pointing out the sources of error and in suggesting remedies. Medical men have this knowledge, and pediatric practitioners have been the first to see the evils of contaminated milk and the advantages to be derived from pure milk. With scarcely any exception, therefore, every movement looking toward an improved milk supply has been inaugurated and supervised by pediatric practitioners. The work of Coit and Rotch, undertaken along different lines and in different places, has vastly stimulated this movement, and has been largely instrumental in bringing about the system of milk commissions composed of medical men, which have done and are doing more than any other agency to improve the milk supply of cities. The good results of this work are not limited to infants, although it was in the endeavor to secure a better and safer food for them that the whole agitation started. It is entirely proper, therefore, to devote some space to this matter whenever the subject of infant feeding is under discussion. All the work and study which has been devoted to infant feeding would prove absolutely useless if the material from which the food is made is contaminated and dangerous. There is no such thing as successful infant feeding without good milk. In an admirable series of papers discussing the milk supply of cities in its various phases[1] Pearson, of Cornell University, expresses the opinion that there are four influences that are respected by milk producers—legal regulations, intelligent public opinion, the example of high-class dairies, and endorsement by responsible persons. It may be virtually said that a town may have as good a milk supply as it demands, but there must be willingness on the part of purchasers to pay a fair price for milk of good quality. It costs more to produce uncontaminated milk than it does to produce foul milk. In this same series of papers Cook describes the steps that must be taken to obtain pure milk as follows: First a healthy cow; then healthy surroundings; then a clean stable with a proper amount of air space; then a healthy attendant; then clean utensils; then, as soon as the milking is completed, the milk to be reduced to a certain temperature and held at that temperature until shipped. It should come to the middle man without being allowed to undergo any bacteriological change.

The temperature at which milk is kept is a matter of very great importance. Milk produced in clean dairies and then rapidly reduced to 40° will keep for long periods of time. Milk produced at certain American dairies was sent to Paris during the whole summer of 1900 and sold at the exposition in perfect condition. It was a difficult task to convince the Commissioners on Awards that the perfect condition of the milk was due only to cleanliness and cold. Milk used for infant feeding should never become warmer than 50°, until the bottle is warmed at the time of feeding. In May last a letter was sent by Dr. Darlington, Health Commissioner of New York City, to all milk dealers and railroads entering the city, which said that all milk the temperature of which was higher than 50° would be seized and destroyed and the offending persons prosecuted. Dr. Darlington said that more than 2,000,000 quarts of milk came into the city daily and that fully 4,000,000 persons are supplied. He believed that 25 per cent. of the deaths among babies in summer was due to milk rendered dangerous by its high temperature. As long as the temperature of milk is kept below 50° there is little if any danger, but when the temperature rises to 55° or 60° the germs split up and multiply with great rapidity. All milk above 50° will hereafter be destroyed in New York, and the violators will be subject to a fine of $25.00 or $500.00. The milk inspectors have been equipped with State authority, and they are investigating the dairies throughout the State. I would again repeat the importance of keeping all milk at a low temperature, never letting it rise above 50°.

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[1] Albany Medical Annals, March, 1904.

In a recent discussion before the Congress of German Naturalists both Schlossman and Seiffert[1] referred to the injury which may result from the use of preservatives in milk. Hubner also condemned preserved milk. None of the chemicals commonly used for that purpose are wholly free from danger. Even peroxide of hydrogen is not without its objections. The addition of formalin as suggested by Behring checks lactic acid fermentation, but does not inhibit the growth of other germs. Formalin is, moreover, injurious to infants even in minute quantities.

Dr. Reynolds, Commissioner of Health of Chicago, is taking active measures[2] to shorten the time of transit of milk from the cow to the baby. He has already accomplished much in the effort to secure "twelve-hour milk." This is another very important step in securing better food for infants.

Some observations to determine the albumin content of whey are reported by Crulee,[3] of Chicago. With the increasing use of cream and whey mixtures it becomes important to know the exact composition of whey. Whey is a solution not only of lactose but also of albumin. The albumin of whey is of especial interest, because it is of the kind which most closely resembles the albumin found in breast-milk. Its most important constituent, in fact, is albumin, which appears in three forms: casein, lactalbumin, and lactoglobulin. The amount of casein varies with the completeness of the curding. Since of these three albumins the casein is the one which offers the most resistance to the digestive juices of the alimentary tract of the infant, it is evident that the more thoroughly this is removed—*i. e.*, the more complete the curding—the more suitable will the whey be for infant feeding. The percentage of albumin found in whey varies according to different writers all the way from 0.86 per cent., as found by Koenig, to 1.02 per cent., as found by White and Ladd. Crulee's results differ materially from these figures, ranging from 0.2928 to 0.6616, the average being 0.5013. He gives in detail his method of examination. The preparation of the whey was as follows: The skimmed milk was heated to 106°, and the rennet added in the proportion of one grain to the quart. The milk was then stirred well for a moment and then allowed to stand without any agitation for thirty minutes. The curd was then broken up and removed by filtering through a wire sieve and the filtrate (whey) heated to 150° to destroy the enzyme. These differences in results are apparently due to a variety of causes, one of the most important certainly being the method of preparing the whey.

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[1] Medical Record, October 15, 1904.

[2] Medical News, October 1, 1904.

[3] Archives of Pediatrics, June, 1904.

Some important study on the ferments of cows' milk has been reported by Lesperance, of Montreal. As the result of this study he believes that cows' milk contains numerous ferments. We are now in a position to say that we have determined definitely the presence of trypsin, of the lipasic and oxidizing ferments, and of a glycolytic ferment. There is, however, reason to expect further discoveries in this direction, and this is not improbable when the complexity of the nature of cows' milk is taken into consideration.

LARYNGOLOGY AND RHINOLOGY.

By CHARLES P. GRAYSON, M.D.

The Serum Treatment of Hay Fever. All rhinologists and probably a very large number of general practitioners have alike been watching with much interest during the past summer and fall the treatment of hay fever with the recently introduced Dunbar serum. In last year's issue of this volume I gave a complete description of the methods employed in the preparation of this serum, and of the clinical experiments that Dunbar himself had made with it previous to placing it in the hands of others. Although somewhat costly, quite a sufficient supply of it has been obtainable since last spring to permit of a pretty fair test of its prophylactic and curative powers. We have had reports in many medical journals from a number of investigators, and, in addition, the treatment has been discussed in several of the county and State medical societies. Of course, we all know that whenever a new remedy of any apparent promise is introduced to combat a disease of any degree of prevalence there is an inevitable group of men who make a hasty and superficial trial of it, and then hurry into type with accounts of their cases and deductions therefrom that are not worth the ink with which they are printed. Some three or four years ago we had a small flood of this sort of literature anent that absurd mixture called liquor ambrosia. Some of us smiled when we first heard it modestly announced as a "great discovery," and then waited with amused confidence for the columns of amazing cures that, in spite of its worthlessness, we knew would follow quickly upon its introduction. We were not disappointed, nor have we been in the same expectation concerning the Dunbar remedy. We have been regaled with descriptions of the almost magical cures of a number of chronic neurasthenic sufferers from hay fever, who stay cured, however, only for the few weeks that the mental effect of the remedy lasts. This is the sort of patient who can always be depended upon to be cured for a time by impressing him with the novelty and the infallibility of any method of treatment. I have no intention of ridiculing the Dunbar antitoxin itself, but only those very premature individuals who, upon so short an acquaintance with it, consider themselves justified in terming it the long-waited-for specific.

To realize how far, how very far, it is from being anything of this kind, we need but study a few of the very large number of cases in which it has failed to afford the slightest relief. These are the patients in whom the neurotic factor of the disease has been but slightly in evidence, in whom the controlling effect of the imagination has been wanting, and in whom the element of faith was too feebly developed to extend any material assistance to the remedy. It is in the treatment of such neutral subjects as these that the actual value of the remedy has been weighed in the balance and found wofully wanting. Dunbar's theory that hay fever is the result of a systemic intoxication, and that the toxic material is contained in the proteid bodies found in the different flower pollens, is a very plausible one, and, better than this, it is very probably true. He has, beyond any doubt, succeeded in obtaining from these pollens a toxin of which a drop or two placed in the nose or within the conjunctival sac will in a few moments develop a group of typical hay-fever symptoms. He has also by a series of animal inoculations with this toxin procured an antitoxic serum that will promptly neutralize its effects. This has been demonstrated, and it is very interesting, and, to a certain extent, encouraging. It is, perhaps, a step in the right direction, but it is, I fear, but a step. What we are waiting for is an antitoxic serum or an antitoxic anything that will arrest an attack of genuine hay fever as well as an artificial one, and that will be as powerful a prophylactic as a curative. So far from finding this in Dunbar's pollantin, I say again this year, as I said last, that it has absolutely failed to justify its claim that it be regarded as a specific. For every lonely case which it has seemed to relieve or, perhaps, for a time long enough for the optimist to write a hurried report, to cure, a score of others can be cited in which it has proved utterly worthless even as a palliative. It has, in fact, proved of no more value than, if as much as, the cocaine and adrenalin combinations that so closely preceded it. And why, may we not ask, should this Dunbar serum treatment be regarded as rational? Is it, indeed, anything more than a mere treatment of symptoms? I have always thought that the one and only rational treatment of hay fever was that which attempted the abolition of the constitutional factor of the disease. If treatment directed to this end were successful the hypersensibility of the upper mucous membranes would be so completely removed that the pollen or other exciting cause of the disease would encounter a tissue calmly indifferent to its presence and from which it would elicit no sign of irritation. Any system of treatment that could achieve this would certainly be deserving of the term rational. It would be only such a result as this, such an increased tolerance and stability of the mucous membrane and its nerves that they will be possessed of no more than a strictly normal sensibility, that would represent a genuine immunity against this disease. And we may as well recognize now as later that such a radical change as this can only be gained through hygienic and general measures. We cannot stamp out constitutional and temperamental peculiarities by administering drugs or antitoxic serums. These may, perhaps, lessen somewhat the intensity and duration of the commotion induced by atmospheric irritants, but we cannot reasonably expect from them much, if anything, more than this. If it is a real immunity that we are looking for, it is not within the pages of the *Pharmacopœia* or through the inoculation experiments of the laboratory that we are going to find it. Hay fever is not that kind of a disease. It is an idiosyncrasy, an individual susceptibility with which we have to deal, and not with an organism or a substance that is universally poisonous. And there is another phase of this disease that should be very constantly borne in mind while we are endeavoring to discover a cure. It is not in all cases that some variety of pollen is the exciting cause. There is a certain number of people, and by no means a small one, in whom the attack is precipitated by the inhalation of some emanation from the horse, the cat, or some other species of animal. Among the victims of this disease whom I have treated there have been several who were entirely unaffected by anything of a vegetable nature. They could stroll with undisturbed serenity through meadows thick with flowers, or fields of hay or rye, or lanes bordered with golden rod or rag-weed, and yet the moment they ventured to drive in an open vehicle, even were it through the verdure barren streets of the city, the scent or some other effluvium from the horse would plunge them into all the miseries symptomatic of this disease. I have known an attack occasioned in this way to endure for a week or ten days. And it is to be added that these people could go over the same route in an automobile or on a bicycle without the slightest intimation of any nasal or ocular disturbance. Now, what can we expect Dunbar's serum or its derivative powder to do for cases like these? Such cases may be called vasomotor rhinitis instead of hay fever, but is there any symptomatic difference? For myself, I am at a loss to understand the applicability of the term "rational" to this method of treatment, and I am convinced that the only treatment worthy to be so designated is one that will reorganize the patient, so to speak, and so steady the sensory and vasomotor nerves of the upper air tract that he can live in an atmosphere of pollen without so much as a sneeze. I am quite willing to admit, in fact, I insist, that to effect such a change is apt to require months of patient and unremitting care and self-denial upon the part of the sufferer from the disease, but that such a result is possible I have seen a sufficient number of cures to make me firmly believe. The prophylaxis of the disease should not be deferred until the patient's nervous condition is ripe for its establishment, but it should be begun almost in the cradle. The child who is born of neurotic parents in either of whom there is a history of hay fever or asthma should be developed physically rather than mentally, should be trained as an athlete rather than a scholar. The emotional element of his character should be stunted in every possible way, and, if he is to escape the nerve storms and distresses of his parents, it were better, during the earlier years of his life, to bring him up as a healthy and untamed animal than as an intellectual human being.

The Accessory Nasal Sinuses. During the past year there has been the usual abundance of literature concerning the acute and chronic suppurations of the accessory sinuses. We have been still further instructed as to their causes, their symptoms, their pathology, and their treatment. Concerning the latter, ease and completeness of drainage is, of course, the primary consideration; but having determined upon this we may, perhaps, be somewhat bewildered, and lose more or less valuable time if, instead of relying upon our own surgical sense and skill, we stop to choose from among the many different methods of operation that have been proposed by others. Of course, the differences that distinguish them are mostly mere matters of detail, but it is these usually trivial distinctions that have led to an unnecessary multiplication of instruments. The man who knows his anatomy and who has acquired a proper amount of manual skill is not apt to be dependent upon any unusual refinement of instrumental assistance, but for those who may be lacking in either of these qualifications there are especially devised drills and perforators and cannulas without end.

Among the whole year's output of papers dealing with this subject it has seemed to me that the one that has put the whole matter in a nutshell and that has given us the kernel of basic truth that we want is that by J. Mackie,[1] entitled "Notes on Nasal Suppuration." It opens with four propositions:

1. That the essential cause of nasal suppuration is defective drainage.
2. That defective drainage is mainly due in childhood to adenoids and lymphoid hyperplasias.
3. That later it is the result of hypertrophies and deformities resulting from lymphoid hyperplasias during the period of active growth and development.
4. That by adopting this view of the natural history of nasal suppuration the whole subject becomes more intelligible and a simpler and more rational treatment becomes possible.

In reviewing this article I repeat very frequently his own words. In support of the first of his contentions he calls our attention to the well-recognized fact that "from earliest infancy to adult life the nasopharynx is a region peculiarly liable to catarrh and hyperactivity of lymphoid tissues," and that this implies that for a considerable period of early life, while the growth and development of the nasal cavity is being effected, the nasopharynx is in a state of active congestion, its mucous membrane being bathed with purulent or other irritating discharges. He fears that, although in connection with the existence of adenoids, we may be fully cognizant of the narrow and highly arched palate, the gaping mouth, and the look of stupidity which comes from habitual mouth breathing, we are yet apt to overlook or to belittle what is, perhaps, of more serious import—the malign influence of early nasopharyngeal disease on growth and nutrition. Systematic investigation of this point that takes advantage of every opportunity to inform ourselves of the early history of people with normal noses will demonstrate, he thinks, that few if any of them have suffered from catarrh for any significant length of time during their childhood. Whereas, on the other hand, if we analyze our cases of septal and turbinal distortion, our chronic smouldering empyemata, and above all our cases of ozæna, we will never fail to uncover a history of prolonged nasopharyngeal trouble in early life. He refers, in addition, to the frequency with which certain young adults are brought to us for sinus or other intranasal mischief upon whom a number of years previously we have operated for adenoids.

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[1] Journal of Laryngology, Rhinology, and Otology, October, 1904.

It is because these postnasal vegetations are a disease of very early life and that parents are usually slow to recognize their existence that children are seldom brought to us for treatment before a number of intranasal changes have been produced by them which a simple clearance of the nasopharynx is too late to remedy. It has long been Mackie's custom when such cases are brought to him to carefully examine the nose, and in the event of his finding any considerable obstruction he endeavors to deal with it at the same time that he performs the adenoid operation, the part usually receiving the major portion of his attention being the head of the middle turbinal.

In those instances in which it is possible to combine the two operations this custom will, no doubt, meet with general approval, but unfortunately these are but comparatively few in number, and in the others in which one operation must precede the other by, perhaps, some days, it is better, I think, that the nasal obstruction should be removed first. Being ignorant of their relative difficulty, the parents almost invariably regard the removal of the adenoids as the major operation, and it is upon the performance of this that they expect immediate and more or less complete relief of all the symptoms. If this, however, be not promptly apparent because of coexistent intranasal obstruction, the disappointment of the parents may lead them to discredit the value of our surgery, and, in spite of our explanations, to decline anything further of that nature.

In speaking of *ozæna,* Mackie expresses the opinion that almost if not all cases originate in early chilhdood, and that they are due to the conditions that interfere with proper nasal drainage. Should this view be correct, then, he thinks, an ordinary case of ozæna will afford eloquent testimony as to the influence of foul discharges or development. "Taking an average fairly severe case the middle turbinal will be found in its anterior half broadened, pressed against, and seemingly incorporated with the outer wall. Its posterior half is even more hypertrophied, often twisted on itself, and curled backward and upward. In extreme cases, where the face is flattened and the spheno-ethmoidal recess shortened, it may be found pressed against the anterior wall of the sphenoid. It is very easy to see in such a case how drainage is interfered with. The outlet from the posterior ethmoidal and the sphenoidal cells is blocked, while the spheno-ethmoidal recess itself has become practically a closed cavity." It is entirely reasonable to suppose, should the view that nasal suppuration has its origin in the nasopharyngeal diseases of childhood be regarded as the correct one, that its first indications would be met with in the region of the middle turbinal and the ethmoid cells.

In passing to the consideration of *sinus disease,* Mackie takes occasion to say that it is because the study of the diseases of the nasal sinuses began with those most easily within reach of the general surgeon that the idea still prevails that the maxillary and frontal sinuses are those most frequently affected. As a matter of fact, he thinks that an enormous preponderance of all cases of sinus disease have their seat in the ethmoid. He has no desire, however, to enter upon any discussion of this point, his one aim being to concentrate our knowledge of straggling facts and to arrive at some practical common-sense view of the situation which shall offend neither our conceptions of normal nor of pathological anatomy, which shall be explanatory as far as causation is concerned and helpful as far as treatment is indicated. To facilitate this, he thinks it far better, instead of studying the different sinuses as individual and distinct cavities, to look upon them as massed together and as being interdependent parts of the composite skull. If we agree to this, and surely few of us will not, it becomes evident at once that the centre of such a system must be the region of the middle turbinal. "Here the various sinuses open, through here all discharges must pass, and here disease or obstruction, by all the laws of surgery, will surely lead to disease in the parts beyond. And if we except a few cases of antral disease of dental origin, probably almost all our cases of nasal suppuration do so originate."

Although he recognizes the frequency with which the frontal sinus is the seat of disease, yet the author intimates his belief that this is merely the accompaniment in most cases of anterior ethmoidal suppuration.

The same idea governs his attitude concerning disease of the sphenoid, which, he thinks, is more common than that of the frontal, and is practically always associated with posterior ethmoidal mischief, "the victim of which has but to lie upon his back to get a drip of infecting pus into the sphenoidal opening." As to antral disease, while admitting the occasional infection of the cavity from dental sources, he thinks the proportion of such cases greatly overestimated, and that much the greater number arises, as in frontal and sphenoidal disease, from conditions obstructive or infective within the nasal passages. This, he contends, and with excellent reason, is strikingly seen in many cases in which antral suppurations, which had persisted even after so-called radical operations, rapidly disappeared when disease in the middle and upper regions of the nose was dealt with.

Mackie's observations concerning ethmoidal disease merit full repetition here, and permanent preservation within the pages of this volume. They follow: "It is a convenience to divide ethmoidal cases into anterior and posterior—not, however, because of mere anatomical considerations, for which, perhaps, it is possible to have a too slavish regard. As our experience broadens, we soon see how often nasal suppurations laugh both at anatomy and physiology, the presence of pus in any particular region of the nose being about as deceptive as the position of pain and as uncertain as a safe guide to the true focus of disease.

"With reference to disease of the posterior set of cells, of all nasal suppurations perhaps the earliest and the most common, the characteristic symptom is postnasal catarrh. This time-honored term covers a set of symptoms which has been a fruitful source of worry to the physician down the whole history of our art. With its simple forms we are all familiar, and they need not be further considered here. I should like, however, to draw attention to a type less common, perhaps, but of which a full knowledge is essential not alone to the rhinologist, but to the family doctor and practising physician. I refer to those cases in which the constant foul drip from the diseased posterior cells has infected not only the pharynx and larynx, but even the trachea and bronchi, where a set of symptoms has been set up, which, along with the depressed health and occasional elevation of temperature, is often mistaken for phthisis. In these cases it is not a question of irritation and cough from the mere physical presence of pus, but a genuine and specific infection from above. I was able to verify this in some of my cases, where a profuse purulent discharge could be seen bathing the larynx and clinging to the side of the trachea, a discharge similar in every way to that which was found on the back of the palate and oozing from the posterior nares.

"On several occasions I have remarked the muddy brown nature of this pus, and an odor varying from a faint, sickly aroma to the full fœtor of ozæna."

In illustration and support of his convictions concerning ethmoidal suppuration, the author details several cases the approximate duplicates of which most of us have seen in sufficient number to make us readily willing to grant the justice of his views and to accept as entirely rational his suggestions concerning treatment. I cannot too strongly advise every rhinologist to read in the original and to almost memorize every word that Mackie has written upon the subject of treatment. Nothing better and of greater practical value has been written not only within the past year, but within the past decade. I can but give a few extracts here, but I am sure that these will more than justify my high opinion of the original and lead to the adoption by many of my advice that it be carefully read. He premises that the general principles of surgery hold good in the nose as elsewhere, and must not be ignored. The general surgeon who meets with an inflamed and suppurating area with pus channels ramifying among the tissues will be satisfied with nothing short of a thorough exposure and drainage of the whole diseased area. It should not be otherwise with the rhinologist, and unless he bear this constantly in mind and carry it out in practice, his results in treatment are not likely to be very satisfying. The author, judging from his own early work, and, to some extent, from what he has seen of the work of other surgeons, is convinced that tinkering surgery in the presence of advanced sinus disease is productive of more harm than good. "If we do not feel sure of our ground, if we are not satisfied that the confidence of our patient will stand the strain of a tedious and painful course of treatment, if we are not ourselves prepared to go fearlessly on with our case straight to the end, it were better for our patient that we altogether held our hands."

There is usually a great difference both in the mode and duration of treatment between cases that are of comparatively recent origin and those that are of long standing. In the former, which may have ensued upon an attack of influenza or have been the outcome of even a severe ordinary cold in one in whom the drainage of the middle meatus is obstructed, a complete and prompt cure may generally be anticipated upon the removal of the obstruction. In the latter, however, when the passages have become blocked by bony deformities, polypi, and redundant soft tissue, we cannot but expect that progress will be slow. In such cases the author, like the rest of us, has often found it necessary to operate twice, and, not infrequently, three times under a general anæsthetic before effecting a cure.

With reference to his meaning in the use of the word "cure," what Mackie says is again worthy of complete reproduction:

"I may here state that in using the term 'cure' I do not necessarily mean that the last vestige of discharge has ceased. After all, discharge is only a symptom, and by no means the symptom most painful or dangerous to the patient. The surgeon who takes his stand on the symptom of discharge alone, and whose prime consideration is to secure its complete cessation, runs the danger of holding his own skill and his own mere technical results of higher importance than the welfare of his patient. By extensive, perhaps dangerous, operations and the removal of great masses of tissue, an early drying up of the sinuses may be secured, but a nose so treated has to a large extent lost its functional usefulness, a condition of affairs that must ever be greatly deplored. I feel very strongly on this point, and think that in cases of extensive disease, where there is no pressing evidence of extension of infection, we ought to move slowly in treatment, first establishing free drainage through the main pathways of disease, then watching and waiting until it becomes evident what parts are hopelessly diseased, what parts show evidence of returning health, then at a subsequent operation dealing with the hopelessly diseased areas. By proceeding in this way *we conserve much that otherwise would be sadly missed in the future of the nasal economy.*"

In spite of this emphatic counsel that the author gives us as to the conservation of functionally useful tissue, he strongly deprecates any faint-hearted style of operating when we have satisfied ourselves that we have to deal with extensive disease of the posterior sinuses and when the passages are obstructed by masses of diseased middle turbinals. It seems to him, as it probably does to most of us, that the physiological efficiency of the nose is much less reduced by operations upon the middle than upon the lower turbinals. He has observed, in many of his cases of extensive ethmoiditis that have been cured by proportionately extensive operation, that the passages return to almost their normal appearance, and he is inclined to attribute this happy result not only to a certain degree of contraction of the framework of the nose, but also to something that looks very much like regeneration of tissue. "These considerations and the impossibility of effectively dealing with the posterior group of cells until a complete clearance has been made in the middle meatus have led me to use more energy in operating here than elsewhere in the nose." That which he terms the "complete" operation for suppurative disease of the posterior sinuses consists in the removal of the middle turbinal and the bold laying open of the cells with the curette. And he says that though this procedure may look a formidable one to the uninitiated, it is both simple and safe in the hands of the rhinologist.

In case the sphenoidal sinus shares in the suppurative process, his advice is that its treatment be left until later, but he has the best reasons for believing that if the complete operation for the disease of the ethmoidal cells has been performed, the sphenoidal sinus will be restored to health without further surgical interference. Should, however, direct treatment of this cavity prove to be necessary, there is but little difficulty in breaking down its anterior wall, and, thereupon, thorough drainage having been established, it will soon get well.

I am very glad that Mackie, in considering the anterior ethmoidal cells and the frequently associated disease of the frontal sinuses, takes occasion to express his disapprobation of the too often unnecessary performance of external operations upon these latter cavities. Some of us may be strongly tempted at times to enter the frontal sinuses by means of an artificial opening in their anterior wall. It may appeal to us because of its seeming economy of time and the avoidance of the tedium and trouble that necessarily attend the adoption of the intranasal route, but there are many considerations, some of which Mackie gives, that should lead us either to defer for a reasonable time or to abandon, if possible, altogether the external operation. His own words scarcely admit of satisfactory abridgement:

"In dealing with the anterior set of cells, the frontal often gives trouble. Let me here state that I am perfectly aware of the distress often caused by frontal suppuration; I am perfectly aware of the importance attached to its treatment, and of the ingenious operations devised for its cure by several eminent rhinologists. All the same, judging from my own experience, I am obliged to differ from them as to the frequent necessity for such heroic measures. Among my cases of nasal suppuration I have had not a few with frontal complications, but in only one have I found an external operation necessary. Of all the nasal sinuses the frontal surely is the one best adapted by nature for ridding itself of catarrhal secretions, and if it becomes the subject of empyema it can only do so by obstruction in the neighborhood of its ostium. By dealing thoroughly with this I think we will generally find it possible, not perhaps in every case to completely dry up the frontal discharge, but to reduce to a minimum and to remove pain and discomfort. I submit that a slight frontal discharge through a free ostium is a small matter, for which a dangerous and disfiguring operation should not be lightly entertained. Were any rhinologist here unfortunate enough to become the subject of frontal suppuration, I think I may venture to say that he would be very much inclined to take my view of this matter."

As regards *antral suppuration*, the author, while admitting that a certain proportion of all cases is due to dental mischief, maintains that a much larger proportion arises from the same causes as sphenoidal and frontal disease, viz., to obstructive or infective disease in the neighborhood of the natural opening. In those cases that present no abnormality within the middle meatus and that are clearly due to a carious or otherwise diseased tooth, the removal of the offending object followed by a week or two of drainage and daily cleansing will almost invariably lead to the arrest of the discharge. On the other hand, in the many cases in which there is evident persistent obstruction within the middle meatus and where a dental causation can be definitely eliminated, nothing curative can be hoped for from simple drainage, however complete, through the alveolus or the canine fossa. If, however, this be accompanied by the removal of the meatal difficulty, a cure is usually obtained very promptly. The histories of several cases of exceptional interest are related at this point by the author, and they serve to make even more apparent and forcible the wisdom and practical worth of his statements.

The lesson that he has learned from these cases, and which it will profit every one of us to learn also, is to place more reliance upon the restoration of the health and normal spaciousness of the middle meatus than upon simple drainage of the diseased antrum through one or other of the usual artificial openings. It is now his rule, even in the most chronic cases, to first remove all disease above or in the immediate vicinity of the ostium maxillare, and then to content himself with an opening in the canine fossa of only sufficient size to enable him to explore the diseased sinus and to provide for its medication and uninterrupted drainage.

The author concludes his paper with the remark that "the interesting points in connection with the subject of nasal suppuration are so numerous that the difficulty is, not in knowing what to say, but in knowing when to stop." We cannot but regret that he stopped so soon, but within the limits to which he confined himself he has given us far more valuable instruction and suggestion than is contained in the score or more pretentious papers that the year has brought forth. I am sure I need offer no apology for the very complete review of it that I have here given.

Killian's Operation for Chronic Frontal Sinusitis. For those who are possessed of but little manual skill or who are unable to attain the delicacy of technique that is essential for the performance of the intranasal operations by which we are enabled to drain and medicate the accessory sinuses, or, perhaps, for those who prefer the crude and disfiguring methods of the general surgeon, the following brief description of Killian's operation will be of service. In the thirteenth volume of the *Archives of Laryngology and Rhinology* there are two papers dealing with this operation, one by Killian himeslf and the other by Krauss, a former assistant in his clinic at Frieburg. They are both illustrated, and explain quite clearly the various details of the operative procedure. From the commencement of his work upon this sinus it has always been

Killian's endeavor to so improve the surgical methods for the cure of chronic frontal sinusitis that they would not only accomplish a complete and permanent cure, but that they would also give the best possible cosmetic result. Krauss describes very fully and accurately twelve cases, the first of them having been operated upon in 1896. At that time Killian had become convinced that only by sacrificing the anterior wall as well as the floor of the frontal sinus could a certain cure be expected. "Only such a radical proceeding," he says, "is in unison with the principles of modern surgery with regard to the treatment of abscesses in rigid-walled cavities." To change this somewhat complicated cavity into a flat surface, he found it necessary to completely obliterate its bony walls, and by making a resection of the frontal process of the upper maxilla the cells of the ethmoid, which are nearly always affected, were rendered accessible. This method demands absolutely the resection of the entire anterior wall of the sius. Its floor, that is, the orbital plate of the frontal bone, is also completely sacrificed in all patients. This extensive destruction of its walls permits an unobstructed view of the most remote recesses of the cavity, and it also makes it possible for the orbital contents to share in the refilling of the large space thus opened.

A very, if not the most, important detail of the method consists in preserving the upper edge of the orbit in the shape of a bony margin or crest. From a cosmetic point of view, this is probably the most important feature of the operation, and, moreover, by being careful not to remove the periosteum beyond the insertion of the tendinous fibres of the trochlear ring, double images can nearly always be averted.

Killian, recognizing the constancy with which the anterior ethmoidal cells are implicated in chronic abscess of the frontal sinus, insists upon the necessity for the resection of the frontal process of the superior maxilla in order that they shall be thoroughly exposed. Along the channel thus provided easy access is also obtained to the sphenoid sinus. The anterior extremity of the middle turbinal is quite uncovered, and, upon the removal of this, a large communication between the frontal sinus and the corresponding nasal fossa is established. It is advised that the nasal mucous membrane be saved and utilized in forming a flap to cover the defect. Finally, the wound is sutured either immediately upon the conclusion of the operation or a few days later.

After a careful study of this operation and the results obtained by it, I cannot help regarding it as one that would be apt to be employed only by the general surgeon, who is unfamiliar with or inexpert in the intranasal procedures of the specialist, rather than as one that would commend itself to the skilled rhinologist. It impresses me as being the very extreme of radicalism. If one's own experience with these cases of frontal-sinus suppuration has not been sufficient to convince him that such extensive destruction of the walls of the cavity is both unnecessary and injudicious, the reading of Mackie's paper and the study of his cases should be quite enough to lead to that conviction. It is not to be denied that we may at long intervals meet with a long-standing and rebellious case that will refuse to yield to intranasal methods alone, but I can scarcely conceive of one in which these, in combination with an external opening of just sufficient size to permit of the thorough curettage of all diseased tissue, could fail to accomplish a cure. I need scarcely emphasize the fact that by intranasal methods I mean, in common with Mackie, the complete removal of every vestige of diseased and obstructive tissue from the middle meatus. This, of course, implies the opening of the ethmoidal cells and the establishment of perfectly free drainage from them as well as from the frontal sinus through its natural outlet. If this is done in connection with the eradication of all diseased tissue from the sinus itself, what more can "the principles of modern surgery" demand? Certainly, nature will ask nothing more, and I have yet to see a case that has failed to get well under this comparatively conservative plan of treatment.

There have been many other papers during the year dealing with the accessory sinuses, but few of them have added anything to our knowledge concerning these cavities or their diseases. Most of the authors have simply *réchauffé* the writings of Sims and Jacob, of Lathrup and Turner; have gone over the anatomy of the parts for the hundredth time; have rediscussed the best routes for entering the sinuses, and have disputed over some trifling and immaterial detail of operative procedure with as much heat as though they were announcing the birth of a new surgical principle. Such papers serve only to distract attention from the one object that should be the goal of every possible variety of operation—the free opening of the diseased cavity and the complete and rapid escape of its pathological contents. Each of us, in attaining this end, may be permitted to exercise his own personal preferences in the matter of instruments, routes of approach, and postoperative medication. It is the end only that permits of no modification.

Intratracheal Injections. Although the advantages of direct intratracheal medication are generally recognized and the benefit derived from it generally acknowledged, yet it is probable that it is still much less frequently resorted to as a means of treatment in bronchial and pulmonary affections than it deserves to be. In the October issue of the *Detroit Medical Journal* Willis S. Anderson has a paper on this method that should largely increase the number of those who employ it. He has made a large number of experiments on dogs to prove the absorbability of drugs by the bronchial mucous membrane, and to prove that a considerable quantity of a non-irritating liquid can be introduced into the bronchi without injury. After trying various fluids with a view to testing their relative virtues as vehicles, he found that olive oil could be regarded as entirely bland, unirritating, and in every way suitable as a vehicle for medicaments. Intratracheal injections afford a means for the direct introduction of remedial agents and for the bringing of germicides into actual contact with the affected tissues. His experiments have convinced him that they are absorbed into the circulation and act systemically as well as locally without taxing the stomach. Among the substances experimented with were the oils of eucalyptus, thyme, cinnamon, and gaultheria, which may be employed singly or in combination in strengths of from 2 to 5 per cent. in olive oil. He found that menthol has a distinctly local sedative action, and that this is somewhat increased when it is combined with camphor. Campbell's favorite formula is a sterilized mixture of camphor-menthol, 5 per cent.; oil of eucalyptus, 5 per cent.; guaiacol, 2 per cent., in olive oil. The syringe and solution should be warmed to body temperature before they are used. The usual syringe with a cannula of appropriate length and curve is used, and the ordinary dose is one or two drachms, which may be repeated in a few minutes. For the best and most prompt results daily treatments should be carried out. The injection should be made during a prolonged inspiration by the patient, and although it may be made with no other aid than the holding out of the tongue, yet it is better that the syringe be introduced under inspection by the use of the laryngoscopic mirror. Anderson advocates the employment of these injections, in the congestive stage of acute bronchitis, the so-called "winter coughs," asthma, and, except in its advanced stages, phthisis.

Blood Poisoning from Tonsillitis. In the *Lancet*, October 15th, Owen reports a case many duplications of which have probably occurred in which the toxic role of the tonsillar inflammation has not been recognized. It is to encourage the almost routine examination of these glands in cases of sepsis without other evident cause that the report of this case is introduced here. The patient was suffering from a very severe sore throat. Both tonsils were swollen, and a patch of exudate was observed on the left, but a bacteriological examination failed to reveal either diphtheria bacilli or streptococci. Fluctuation was discovered later in the left tonsil, and incision gave exit to a quantity of pus. Thenceforward the condition of the thorax improved, but the temperature, in spite of repeated sponging, continued to rise until it reached 104.7°. The chest was filled with rhonchi, the abdomen became distended and tympanitic, and the tongue dry. The patient grew weak and tremulous, and his mind began to wander. Two days later the left knee had swollen, and there was evidence of effusion on the inner surface of the joint. The following day sweating appeared and the delirium increased. A blood examination discovered the presence of streptococci, but the Widal test was negative. Injections of antistreptococcic serum were now begun, but during three days of their use they had no apparent effect. Five days later the shoulder became painful, and there was soon noticeable swelling of the joint. Tubular breathing was heard over the left lung about the angle of the scapula, the apex beat of the heart had extended outside the nipple line, and a "slapping" second sound was heard in the pulmonary area. A second examination of the blood disclosed nothing abnormal. During the next several days Roux's serum was administered hypodermically, and, in conjunction with this, iron and quinine were given internally. The patient's recovery was protracted, but without further incident.

The frequency with which the collections of lymphoid tissue in the pharynx and fauces act as the pathway for systemic infection has been so often demonstrated within the past few years, that the early examination of this region should be much more a matter of routine than it has yet become.

Tonsillitis as a Cause of Nephritis. The attention of the general practitioner may be more strongly attracted to these glands and the wisdom of investigating their condition made more manifest by a report of J. L. Morse.[1] He describes four cases of acute nephritis occurring in children which were preceded by or arose during attacks of tonsillitis. His paper, and it is but one of many, affords us excellent reasons for believing that either mild or severe tonsillitis may be followed by nephritis, and it should dispose us to regard with much more favor the suggestion that inflammation of the tonsils may be a more frequent cause of Bright's disease than has hitherto been generally supposed. His advice, therefore, that the urine shall be examined during every attack of tonsillitis and that this examination shall be repeated several times throughout the period of convalescence, will be accepted as perfectly rational and judicious.

Laryngeal Tuberculosis. The past year's production of papers concerning this affection has not fallen below the average in number nor risen above it in quality. We are still awaiting a remedy that when brought into direct contact with the bacillus in the laryngeal ulcerations will promptly destroy it without at the same time destroying or seriously irritating the adjoining healthy tissue. Among the medicaments used for this purpose nothing better than lactic acid has yet appeared, but it is gradually being more widely appreciated that, preliminary to its application, the more careful and painstaking is the cleansing of the larynx, the more complete the removal of necrosed tissue and viscid secretion, the more gratifying will the effects of the remedy be. What is true of instruments is equally true of remedies. It is not the thing itself that counts so much as the head and hand that use it. It is not the gun, but the man behind it; and, therefore, it is the skill and thoroughness with which the larynx is prepared for the lactic acid and the skilled energy with which it is applied that contribute very largely to its therapeutic effect. The frequency of its application has also a great deal to do with its success, and, if it were possible to use it twice daily, its power to arrest extension of the disease and to promote cicatrization of the ulcerated areas would be much more noticeable. It was for this reason that I regretted, in a paper published some years ago, that we could not have a special hospital for those afflicted with laryngeal tuberculosis, one in which the house physician and his assistants would be qualified to carry out the local treatment of the larynx as frequently as might seem judicious. I am quite confident that such an arrangement would lead to a much larger percentage of cures of this disease than can be obtained without it.

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[1] Archives of Pediatrics, 1904, xxi

Another twelve months' experimentation with the x-ray somewhat strengthens our hope that in the course of time it may become of practical service as a means of combating tuberculous disease of the larynx. Among others, Tousey, in the *New York Medical Record,* September 3d, expresses the opinion that judicious application of the x-ray or of the ultra-violet ray and high-frequency currents is indicated in every case of tuberculosis, especially tuberculosis of the larynx. One such case is reported in which this mode of treatment was remarkably successful. The expectoration ceased within three weeks, there was great improvement of the voice, a marked gain in strength, reduction of temperature to the normal, and an increase in weight of about two pounds. There was, also, throughout the same period, a proportionate improvement in the condition of the larynx. The area of infiltration underwent a noticeable contraction, and a number of erosions, of varying depth, healed with a whitish appearance that seemed to be due to cicatricial tissue. The treatment consisted, first, in exposure to the x-ray once every four or five days, and, second, exposure to the Cooper-Hewitt light and application of high-frequency currents once in each interval between the x-ray applications. In applying the treatment to the larynx a specially constructed tube was used. This was held close to the outside of the larynx and the rays so directed that they would reach the exact portion of the tissue that they were desired to influence. No shield of any kind was required. The chief difficulty attached to this method of treatment is the stationary nature of the apparatus employed and the necessity which, therefore, exists for the patient to visit the office of the operator. In a rather large proportion of cases it is not practicable for the patient to do this. Possibly, in time, the apparatus may be so simplified that it may become of more general utility.

Primary Tuberculosis of the Pharyngeal Tonsil. D. M. Barstow[1] reports a case that does much to confirm our already strong suspicions of the tonsillar tissues as frequent portals of infection from the tubercle bacillus. Certainly this is a possible pathological role of the several tonsils in which it requires no great stretch of the imagination to believe. Barstow's case seems to have differed only in degree from the many cases in which the Koch bacillus has been discovered in abundance in excised faucial tonsils or in fragments of adenoid vegetations that have been removed by operation. In this instance there had been a cough, accompanied by pains in the chest and sweating, extending over a period of two years. The large number of bacilli found in the sputum would ordinarily have indicated a fairly extensive lung lesion. In spite of most careful examinations, however, no evidence of pulmonary involvement could be discovered. The very prompt subsidence, therefore, of the symptoms after the operative removal of the pharyngeal tonsil, together with the immediate and almost complete disappearance of bacilli from the sputum, go far to establish the belief that the tuberculous adenoid was the primary if not, indeed, the only lesion.

Laryngeal Crepitus as a Sign of Pulmonary Tuberculosis. Remouchamps[2] calls attention to the existence of this sign when there is not the least discoverable pathological sound over the chest by the ordinary auscultatory methods. It is of evident and particular value in those cases in which the bacillus is not obtainable, and in which the existence of fever precludes the employment of the tuberculin test. In eliciting it the patient, preferably erect, faces the physician with his mouth open. The latter places his right hand on the patient's left shoulder, and, resting his left thumb on the patient's chin, approaches his left ear to within two or three inches of the open mouth. A fine crepitation will then be perceptible, the maximum intensity of which will seem to be in the larynx, this organ amplifying the sounds which have their origin in the affected pulmonary parenchyma. The sound is approximately like that of a fine pen scratching a paper surface. It is audible in both inspiration and expiration, though more so during the latter. It increases or diminishes with extension or retrogression of the pulmonary lesion. In some instances it can be heard with the patient's mouth closed, even, at times, at a distance of several feet. The persistent absence of this sign, the author thinks, justifies rejecting the diagnosis of pulmonary tuberculosis.

Such suggestive papers as this should do much to increase the growing tendency to look more frequently to the upper air and digestive tracts for evidences of disease in their lower portions.

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[1] Medical Record, October 8, 1904.

[2] Medical Press and Circular, April 20, 1904.

The Serum Therapy of Ozæna. Although most of us are probably averse to employing forms of treatment of which the method of action is so slightly understood as this, yet the results obtained from the serum treatment of ozæna have in many instances been so gratifying, have, in fact, so often approximated complete cure, that we may be justified in putting aside both skepticism and prejudice and giving the remedy a fair trial. We can need no better reason for doing this than that, as yet, we have no other remedy, either local or systemic, that has been successful in so large a proportion of cases that we can resort to it with any other feeling than one of mere hope. There is no method of treatment, be it nutritive, alterative, or mechanical, that we can adopt with any real sense of confidence. The submucous injection of paraffin is no more than palliative in its results, its effect being merely to lessen the rapidity of crust formation and to diminish somewhat the size of the crusts. Even the most optimistic of its advocates can scarcely pretend that it has any regenerative influence upon tissues that exhibit any marked degree of atrophy, nor can it be claimed to exert more than a very temporary stimulation upon the nutritive processes of the mucous membrane.

For several other reasons, therefore, in addition to the frequent success that seems to have attended the use of antidiphtheritic serum in this disease, we should be encouraged to try it. Siziemsky has collected from the literature of ozæna 110 cases that have been treated by this agent. Of these, 22 per cent. are said to have been permanently cured; 6 per cent. almost completely cured; 37 per cent. improved; 24 per cent. temporarily improved. In 8 per cent. the result was uncertain because the treatment had been abandoned too early, and in 3 per cent. the results were negative. It appears, therefore, from this statement that diphtheria antitoxin is a remedy that gives favorable results in the majority of cases of ozæna in which it has been used. Although the theoretical basis of this treatment has not, as yet, been clearly defined, yet the clinical results obtained by it have been so satisfactory that it may be regarded as one worthy of a certain amount of respect, if not confidence. The author reports 2 cases of his own, in each of which he secured a successful result with this remedy. It is not in the resemblance of the germ of ozæna to that of diphtheria that the theoretical basis of this treatment should be looked for, but rather in the similarity in a chemical sense of the toxins of these two affections.

Nervous Symptoms Caused by Hypertrophy of the Lingual Tonsils. The role of the nose as a centre for an infinite variety of reflex nervous disturbances has, perhaps, been somewhat overdrawn. Many cases have been gravely reported in which some long-standing neurosis has seemed to be magically cured by the correction or removal of some more or less trifling abnormality within the nose. Too often the neurotic temperament of the patient and the strongly controlling influence upon its manifestations which is exerted by the confidence-breeding personality of the physician have been underestimated or entirely overlooked. Too often a successful result in patients of this type, which practically is little more than an example of "faith cure," has been solely attributed to the surgical removal of some imaginary disturbing lesion within the nasal fossa. Such cases are always entertaining, and, in a way, instructive, but they should always be regarded as cases of primary nervous disease to which the nose bears no etiological relation, but for the control of certain symptoms of which it may be used as an indirect therapeutic agent.

I should say that the cases reported by Jankelvitch[1] under the above title belong to this class. He enumerates the different symptoms provoked by hypertrophy of the lingual tonsil, especially in women, and asks if enlargement of this tonsil is alone sufficient to develop these nervous troubles, or if there must be a special nervous predisposition for the evolution of such affections.

The symptoms in his cases were the sensations of a foreign body in the throat, pharyngeal tenesmus, and reflex cough. In the first case the patient had a constant desire to swallow; in the second, to spit out some foreign body. The latter patient insisted that she could not prevent such attempts. During the menstrual periods the foreign bodies seemed to increase in size, the patients believing themselves affected with cancer. Most of the cases of this kind that have been observed have been between the ages of forty and forty-five years; that is, about the time of the menopause.

The cauterization of the lingual tonsils in those cases reported by Jankelvitch was sufficient to subdue all the nervous symptoms associated with them and which had resisted all other forms of treatment. In these patients, however, the symptoms of nervous disturbance were almost limited to the immediate vicinity of the lesion that provoked them, and, therefore, the curative influence exerted by the reduction of the tonsil was much more direct than it is in many of the operations performed upon the nose for nervous symptoms quite remote from this supposed seat of disturbance. In many of the cures of chorea, epileptiform seizures, and similar disorders that have been gained through intranasal surgery, we may entertain a reasonable doubt as to whether the result is not due rather to the effect of the operation upon the nerve centres than to the removal of a merely possible source of peripheral irritation.

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[1] Rev. heb. de laryngol., d'otol., et de rhinol.

Chancre of the Inferior Turbinate in a Child Aged Seven Years. In certain of its features this case reported by Brunn[1] is so almost unique that it should have a wide reading. The recognition of acquired syphilis in children, unless it stares us in the face, is often a matter of considerable difficulty, and is, at least, apt to be long delayed. The lesson taught by a case such as this, therefore, is that we shall leave no region unexamined that may contain evidence that will make an early diagnosis possible. The child was weak and sickly, and had enlarged glands in the left submaxillary region. There being no inflammation, however, of the tonsils, mouth, or ears, Brunn diagnosed scrofula. The nose externally seemed normal, and swallowing was painless. The glands continued to increase in size, and those of the other side became painful. Three weeks later a papular eruption appeared upon the forehead and shortly afterward upon the trunk and scrotum. One mucous patch was found inside the mouth, but no primary lesion could be discovered. The nasal fossæ were not examined until the glands about the hyoid bone became enlarged. The parents then recalled that at first the child had a coryza with bloody mucoid discharge from the nose, snoring, and difficulty in breathing. Internal examination revealed a small red and blood-stained ulcer with well-defined edges upon the inferior turbinated body, and some swelling upon the opposing surface of the septum. Under antisyphilitic treatment the child recovered slowly, the disease running a severe course and leading to a perforation of the soft palate.

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[1] Rev. heb. de laryngol., d'otol., et de rhinol., March, 1904.

OTOLOGY.

By ROBERT L. RANDOLPH, M.D.

EXTERNAL EAR.

Aural Herpes Zoster. Ordinarily herpes zoster is seen somewhere in the course of the distribution of a sensitive nerve. Paralysis of a purely motor nerve is rare. Sensorial nerves can also be paralyzed, and among the most frequent of this variety we recall disturbances in taste, following invasion of the chorda tympani in facial paralysis. Neuritis optica has also been seen in a case of frontal herpes, complicated with paralysis of one of the branches of the oculomotor. I do not know that I have ever heard of a case of paralysis of the acoustic and facial as a result of herpes of the auricle and neighboring parts, but such a case is recorded by Körner.[1] The patient was a man, aged fifty-five years, who had been operated upon for cancer of the breast, and following the operation he had suffered considerable pain all over the body. A vesicular eruption appeared on the right side of the head and neck, and eight days later hearing disappeared in the right ear, and there was facial paralysis. The herpetic eruption was located in the concha around the canal, above the auricle on the scalp, in the nape of the neck, in front of the ear, and on the face. The branches of the facial, which ran to the frontal and ocular regions, were entirely paralyzed, while those of the buccal region were only partially paralyzed. The chorda tympani was paralyzed. The drum membrane on that side was normal, although the watch pressed strongly against the ear could not be heard. Hearing of the other ear was all right. Treatment with faradization for three weeks caused a disappearance of the facial paralysis and an amelioration of the deafness.

Stenosis of the External Auditory Canal. Stenosis of the external auditory canal after exenteration of the middle ear is always a possibility which confronts the operator, and various measures have been suggested to avert such a mishap. These suggestions have come chiefly from Zaufal, Stacke, and Körner. None of these observers, however, can be said to have devised a procedure which is perfectly reliable, for notwithstanding the greatest care the canal will close up. Botey[1] has devised the following procedure: He makes an anterosuperior incision the entire length of the membranous canal out to the auricle, at the location of the anteroauricular groove, and between the superior border of the tragus and the root of the helix in the concha. In this space there exists no cartilage, and the section is easily made. In this way one obtains a meatus large enough to pass in the thumb in the case of an adult, and the index finger in children. In order to secure the permanency of this big meatus a metallic cone, slighly flattened and pierced with little holes and having a calibre of from 15 cm. to 22 cm. in breadth and from 16 cm. to 24 cm. in length, is introduced into this canal. The cone should remain in position for five or six weeks, sufficiently long enough for complete epidermization. It is well to introduce into the cone a mesh of gauze covered with vaselin. In this way, without disturbing the cone, we can renew the tampon and dress, so to speak, the cavities of the ear, without causing any suffering. Botey thinks from an æsthetic point of view the operation leaves little to be desired, for the large opening of the canal is entirely concealed by the tragus. The results obtained by this method are admirable, for we have obtained a large auditory canal almost invisible at first sight and by way of which we can detect the slightest sign of relapse.

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[1] Münchener med. Wochenschrift, January, 1904, No. 1.

Removal of Foreign Bodies from the External Auditory Canal. The removal of foreign bodies in all so-called fresh cases must be attempted only with the syringe, and if we do not succeed at the first sitting one or more trials (with a day or even more intermission) should be made with the same method unless serious symptoms demand the immediate removal of the foreign body. Leuter[2] is of the opinion that we may deviate from this rule only when there is a perforation of the drum membrane present, and the tube is wide, so that it is difficult to get a good *vis a tergo*—that is to say, a strong backward current of water, or when the foreign body is so soft that it can be safely removed with the forceps. If, after giving the syringe a faithful trial, we fail to get out the foreign body, we should, of course, attempt to remove it with the aid of a reflector and forceps. Generally speaking, this can be done without giving an anæsthetic in the case of adults, but in little children it is a rather hopeless job without a general anæsthetic. When our efforts at extraction have failed and much bleeding and swelling have resulted, it is well to wait until the canal has recovered its usual appearance and then to make a similar attempt; and only after this operation has been fruitless should we resort to the retroauricular incision. It is interesting to note the fact that foreign bodies of steel can be removed with the strong magnet. Such a case has come under my own observation where every attempt had failed to remove a steel ball (from a bicycle) from the external auditory canal of a little boy. The giant magnet was used with a prompt result. Shoe-buttons, which are sometimes introduced into the canal, have a metallic portion which might respond to the influence of the magnet. At least the trial could be made in case the syringe has failed.

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[1] Rev. heb. de laryngologie, d'otologie, etc., September 3, 1904.

[2] Archiv für Ohrenheilk., vol. lxi. p. 74.

Bearing upon the subject of foreign bodies in the canal, I would remind my readers that I have found peroxide of hydrogen the most valuable of the agents which are used generally for softening cerumen, so that it can be easily removed with the syringe. Strong solutions of bicarbonate of soda or of sweet oil have long been in favor, but my opinion of hydrogen peroxide has not changed since I first spoke on the subject a few years ago. I still regard it as much more effective than either of the agents just mentioned. Halasz[1] reports a case where hydrogen peroxide was used repeatedly in an external auditory canal which contained a bean, and where the well-known chemical reaction of the agent (formation of masses of bubbles) had the effect of forcing the foreign body out of the canal. Upon the basis of this experience he recommends that a solution of hydrogen peroxide in a 5 to 10 per cent. strength should always be poured into an external auditory canal which contains a foreign body, especially in cases where the syringing has failed to remove the latter.

I have always used the agent undiluted in cases of cerumen in the canal, and have simply instructed the patient to fill the canal two or three times and to allow it to remain in ten minutes, and as a result hardened cerumen is easily and promptly removed.

MIDDLE EAR.

Tuberculosis. I have spoken a number of times on this interesting topic, and I have generally taken a rather pessimistic view of the outlook in this disease of the middle ear. Hegetschweiler[2] reports several cases which induce me to take a somewhat more favorable view of this variety of middle-ear affection. I must confess that the majority of cases of middle-ear tuberculosis which have come under my own observation were in individuals who were about to enter the valley of the shadow, and the ear trouble was really a terminal event. Dreyfuss[3] reports seven cases, in all of which the local affection entirely disappeared as a result of improving the general condition through means of climate and internal medication. Local surgical interference was also resorted to in his cases, with a view of getting good drainage and so ridding the middle ear of tuberculous tissues. Hegetschweiler reports four more cases, and all terminated favorably. It stands to reason that treatment of the constitutional affection and the aural trouble must go hand in hand, and improvement will only be noted where the general condition improves. The author calls attention to the great value of high mountain climate. He has also found that the insufflation of fine iodoform powder after cleansing and drying the ear has given the best results in his hands.

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[1] Archiv für Ohrenheilk., vol. lxi. p. 102.

[2] Zeitschrift für Ohrenheilkunde, vol. lxiii..

[3] Ibid., vol. xliii.

Middle-ear Suppuration and Gastrointestinal Troubles in Infants. The fact may be recalled that several years ago I reviewed a number of communications on this subject. Meltzer, Ponfick, and others have made numerous autopsies on infants who had died of gastrointestinal trouble, and in most of these cases they found suppuration in the middle ear. They concluded that the aural condition was responsible for the persistence of the gastrointestinal disease, and consequently for the death of the child. One would expect that such observations would excite considerable interest everywhere, and that they would set on foot systematic examinations of the ears of infants affected with intestinal disorders. Strange to say, however, there have been at the hands of clinicians at least no reports in confirmation of the observations of Ponfick and others, and it is presumable that obstinate gastrointestinal troubles in infants are viewed in pretty much the same old way as regards cause and treatment; in other words, the theory as to the ear being a possible source of infection has not been entertained. I have no doubt but that the great difficulty of getting a satisfactory view of the tympanic membrane in a very young infant has stood in the way of making an examination of the ear. Even to an expert it is no easy matter to interpret the picture presented by a tympanic membrane of an infant a few months old. For the past two years there has been no allusion to this subject in literature, but very recently Barbillon[1] has returned to the subject and brings forward proof which goes far to strengthen the statements of Meltzer and Ponfick. He has made a systematic anatomical examination of the middle ear, and it is certainly surprising the frequency with which he found suppuration, although there was absolutely no clinical symptom of such a condition, and he is of the opinion that in the case of newborn infants who have been a certain length of time in infected surroundings and who die that an anatomical examination will be apt to reveal suppuration of the middle ear. In an examination of twenty-seven cases he found the antrum and middle ear filled with pus in twenty-five. He gives a very interesting clinical picture of these infants. When they first come to the clinic they are, generally speaking, in pretty good shape, though they are often somewhat feeble from premature birth. Still for the first few days after admission into the hospital one will notice an increase in weight. Suddenly, and as a general thing, about the eighth or tenth day and sometimes sooner the infant commences to vomit its milk, and a yellowish or greenish diarrhœa appears. The child then grows pale and has a tired look. In these cases it is usually impossible to find anything which could have caused the digestive disturbance. If there is any temperature change it is often at first seen in a subnormal temperature. In spite of the usual treatment for these digestive troubles, such, for instance, as a fluid diet and intestinal irrigations, the condition grows worse, and, finally, the child dies. At the autopsy one finds nothing noteworthy in the digestive tract, certainly nothing that will explain the symptoms but an examination of the middle ear will almost invariably disclose pus. As a rule, there is no perforation of the drum membrane, but the latter will be found to be the seat of deep changes. Inasmuch as otorrhœa is rare the presence of suppuration is not recognized during life; indeed, there is not the slightest local symptom which would excite suspicion as to the true origin of the trouble. No doubt an examination of the drum membrane at this stage might show changes, but, as I have said, it is an exceedingly difficult matter to get a satisfactory inspection of the drum membrane. The canal is very small, and the walls often lie in apposition, and the canal is not infrequently filled with desquamated epithelium. In the presence of so many cases of this character, considered as a general thing as primarily an alimentary disturbance and treated as such, and which are only septic infections of aural origin and which cannot be detected during life, but the existence of which is demonstrated at the autopsy, he is convinced that too much stress is laid upon the so-called pure and simple gastrointestinal infections of infants. The author gives some valuable information as to the diagnosis. While infants affected with the ordinary gastrointestinal disorder are consumed with thirst, we may expect the trouble to be of aural origin when the patient has complete loss of appetite and only *slight* thirst. Sometimes, indeed, the child refuses to drink. And we may come to this conclusion in spite of the presence of marked gastrointestinal symptoms. Again, in genuine gastroenteritis the infant cries violently, but when there is marked apathy or depression we must suspect that the ear is involved. Finally, the failure of the usual treatment, found to be so efficacious in troubles of the digestive tract, primarily will warrant us in attributing the condition to an infection which has its origin in the pharyngoaural region. These points are worth bearing in mind, and it would undoubtedly be well to subject cases with obstinate gastrointestinal symptoms to an examination of the ears by an expert, and when there is the slightest disturbance in the normal picture, together with the peculiar symptoms just noted, I would advise a free incision of the tympanic membrane.

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[1] Annales des maladies de l'oreille, de laryn., etc., February, 1904.

Hepatitis Resulting from an Infected Ear. Suppurative hepatitis we know, as a rule, is a metastatic affection; in other words, primary hepatic abscess is a very improbable condition. The majority of cases of hepatic abscess are due to infection from dysentery, or, perhaps, from gastric ulcer, or by metastasis from purulent foci either in the kidney or lungs. So far as I know no cases have been recorded where the liver trouble has originated in a purulent otitis. S. MacCuen Smith[1] has placed on record three such cases which are of exceeding interest, and which would at least demand a more careful examination of the liver region in our suppurative middle-ear cases where the temperature is pyæmic and where the usual indications for operation upon the mastoid are absent. Smith reports three cases in which the most interesting features were the following: The most notable early symptom was the acute exacerbation of a chronic aural discharge which, although usually innocuous in character in a few cases, became ichorous and pointed suspiciously to a possible systemic infection. The most constant and characteristic symptom was that of severe pain in the right shoulder and neck, which appeared synchronously with the commencement of hepatic suppuration. The manifestation of pain and tenderness in the right hypochondriac region indicated the hepatic origin of the trouble. The repeated chills, very high temperature (106°), and leaky skin showed that the process was septic in character and likely to prove fatal. The marked accessions and remissions of temperature were typical of a suppurative hepatitis, or multiple abscess of the liver. While jaundice was a constant symptom it appeared so irregularly as to be of little diagnostic value, except in a confirmatory way. The history of secondary infection is clear enough to justify the conclusion that a metastatic abscess of the liver or of other viscera may originate from a suppurative process in the middle ear.

Prophylaxis of Acute Otitis Media. This is a theme which should appeal to us all, and one which Veis[2] has touched rather lightly, though in a practical manner. Most individuals we know in order to clean the nose press the nostrils tight together and blow hard. In this way the outlets of the nostrils are almost hermetically closed, and when the pressure is very strong infectious material, which we so frequently have in the nasopharyngeal region, in scarlet fever, diphtheria, and measles, is driven up into the Eustachian tube and from thence into the middle ear. This method of clearing the nostrils certainly has its disadvantages, not to say dangers. It is no uncommon thing for us to feel distinct pressure in the middle ear when we blow the nose, so Veis suggests that the proper and normal way to blow the nostril is to leave the latter entirely open and free, and to make no pressure upon the outlets of the nostrils. He thinks that as soon as one gets accustomed to this method of freeing the nostrils of accumulations one will find it just as effective as the time-honored way with which we are all familiar. He is of the opinion that the old way of clearing the nostrils is responsible for many of the acute inflammations of the middle ear, and I think he is to some extent right. Attention might be called to the frequency with which we encounter otitis media from sea-bathing. Water gets into the nose and it is sneezed and coughed up, and in this way is frequently driven into the Eustachian tube and middle ear.

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[1] Archives of Otology, April, 1904.

[2] Monatsschrift für Ohrenheilk., 1904, No. 2.

Mooted Points in the Treatment of Acute Otitis Media. It is rather late to refer to an article which appeared nearly a year ago, but it came out after my annual report had been handed in, and is of such practical importance to general practitioners that I may be pardoned for referring to it. Brück[1] has given us a conscientious work based upon a study of statistics as to the actual therapeutic attitude, so to speak, regarding acute inflammation of the middle ear. The author has analyzed the important contributions of Politzer, Bezold, Grünert, Jansen, Körner, and others. From a study of these statistics one sees in the matter of incision of the drum membrane that these eminent observers are by no means in accord, and the same may be said as regards the postoperative treatment. Zaufal and Piffl, for example, are disposed to regard paracentesis of the membrane as indicated in only a few cases which present a certain train of symptoms, but the majority regard this operation as not only very useful, but indispensable. On this side may be found such men as Körner, Passow, Ostmann, Baginski, and Jansen. As far as my experience goes (as I have frequently stated elsewhere) I have never regretted this operation, for it certainly does not prolong the course of the disease; on the contrary, its tendency is very decidedly to hasten recovery. As regards the postoperative treatment, there is also some want of harmony. Many refrain from doing anything after the flow has been started, while others, as, for example, Bezold, and Politzer, believe in prompt irrigation and even in inflating the tube. While there is some division, then, among eminent aurists on these points, they are all unanimous, however, in condemning the insufflation of boric-acid powder, and most of them are against inflating the middle ear. I have always preferred irrigation, and have never employed the so-called dry treatment to any extent, though I have yet to see any harm come from it. I have discussed this point in previous reports, and have yet to find the record of any well-authenticated instance illustrating the danger of using powders in acute suppurative otitis media, though I recognize the theoretical danger. I have always spoken emphatically against the inflation of the middle ear in this condition.

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[1] Deutsche med. Wochenschrift, November 20, 1904.

Gauze Drain in the Canal in the Treatment of Otitis Media Suppurativa. In speaking of the treatment of acute suppuration of the middle ear I have stated that immediately after pāracentesis it is my custom to introduce an aseptic gauze wick into the canal and to leave it in position for thirty-six hours and not to commence irrigations until this length of time had elapsed. Gradle[1] advises that such a wick be left in position throughout the treatment. As far as possible he sterilizes the meatus and auricle with carbolic-acid solution. The gauze wick is thoroughly impregnated with boric acid and introduced into the canal. A large dressing is then placed over the auricle. The external gauze pad is changed as soon as moisture shows, while the tampon may be left in from twenty-four to forty-eight hours at a time. He claims that in cases where the paracentesis has been done early this method of treatment will prevent the exudate from becoming purulent. We know in the early stage it is usually serous. In his experience there is usually a diminution in the discharge in from thirty-six to forty-eight hours. The length of time in some forty cases in which this method was employed varied from five to twelve days in the majority of cases, and exceptionally ran on to fifteen days. It is evident that the gauze drain to be effective must do its work in the early stage of the disease. Unfortunately in the majority of these cases we soon get an infected discharge, and while I have not employed this method it does not seem to me that the drainage can be as satisfactory as when the canal is left open and irrigated. I should think that stoppage and earache would occur. I feel sure, however, that if Gradle's instructions in general with reference to the treatment of this affection were successfully followed, especially with reference to early paracentesis, we would obtain prompt cessation of the discharge irrespective of the gauze drain, though the latter no doubt can be regarded as a reasonable suggestion. Instead of the borated gauze I have generally used an iodoform gauze ribbon passed right up to the drum membrane.

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[1] Journal of the American Medical Association, January 2, 1904.

The Employment of Natural Sulphur Vapors in the Treatment of Chronic Affections of the Middle Ear. Lajaunie[1] has employed this method with success. The vapors are driven into the ear through a catheter under pressure, which should, of course, differ in degree according to the indications. They can be employed even when generated at a very high temperature, and I gather, from what Lajaunie has said on this subject, that he prefers that the vapor be as warm as possible. This method is not applicable to purulent inflammation of the middle ear. It seems to be particularly indicated in the chronic non-suppurative forms, where the bougie and catheter have failed to relieve, and such a condition we find exemplified in the so-called sclerosis of the middle ear. The result of the treatment is seen generally in diminution of the subjective noises and improvement in the hearing. No doubt the vapors exert a most beneficial influence upon the catarrhal condition of the mucous membrane of the tube, to say nothing of its effect upon the sclerosis of the middle ear.

Osseous Necrosis of the Middle Ear. With a view of ascertaining the frequency and the cause of bone necrosis when of neither tuberculous nor syphilitic origin, Scheibe[2] gives us the results of a study of 35 cases of this character. Among these cases suppuration of the middle ear was the direct cause of death in 25 cases, and in these 25 cases osseous necrosis existed 16 times—that is to say, with a frequency sufficient to make one think that this condition plays an important role in the transmission of middle-ear suppuration to the interior of the skull. In 3 cases where the chronic otorrhœa was not the cause of death, the bone lesions did not have the character of necrosis. In 6 cases it was difficult to say whether the endocranial complication was due to the otorrhœa, and among these cases necrosis of bone was found only once. In 16 fatal cases where necrosis of bone was found the bone was exposed in 10, and there were sequestra in 7. The necrosis was more frequently found in the upper part of the middle ear than in either the cavity or the Eustachian tube, and the antrum was nearly always involved. Sixteen of the 17 cases were complicated with cholesteatoma, and in 16 cases the suppuration was fetid. It would seem, then, with absence of any other cause, that these two conditions, namely, cholesteatoma and putrefaction of pus, might be regarded as certainly important factors in bringing about necrosis. In all 17 cases there was retention of pus which was doubtless due in 12 cases to the presence of cholesteatomatous masses, and in 5 cases to masses of granulation tissue. He reminds us that bone necrosis is far more frequent in the clinic than in private practice, just as we would expect. For example, in 852 cases of chronic otorrhœa seen in private practice, the non-specific variety of bone necrosis was clearly established in only 7 cases, and none of these died. In all 7 cases there were cholesteatomatous masses and putrefaction of pus. A study of these statistics shows that in benign cases the retention is due most often to polyps, while in the grave cases it is occasioned by cholesteatomatous masses. It seems clear from this very important and interesting study that chronic suppuration of the middle ear, non-specific in character, is due to local causes, and it may be further said that suppuration only leads to necrosis in those cases where either retention occurs or where there is putrefaction of the pus, and that these two complications are to be found where suppuration itself is associated with the presence of cholesteatomatous masses.

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[1] Annales des maladies de l'oreille, etc., June, 1904.

[2] Archives of Otology, December, 1903.

The Question of Insurance in Connection with Acute and Chronic Suppuration of the Middle Ear. Suppuration of the middle ear should be considered as a matter of serious importance in this connection, and I have touched somewhat upon this subject in other reports. Of course, the chronic form more often comes up for consideration. According to Treitel[1] in the acute forms we should wait three months after recovery in order to avoid such mishaps as sinus thrombosis and brain abscess. In the chronic form cases of death are more often frequent from brain abscess and meningitis. Perforations of the upper part of the drum membrane and granulations in this locality, which indicate disease of either the bones or of the upper wall of the cavity or of both, are undoubtedly more or less serious conditions. From a study of his communication one might accept with some risk cases of otitis media which have been cured, and which present a cicatrized drum membrane, and even with perforation. In cases of persistent suppuration the nature of the discharge is very important. A purulent discharge accompanied with much odor, cholesteatoma, and granulations in the upper part of the membrane would justify refusal on the part of the company to insure. Deafness on both sides with vertigo make the risk much greater, and naturally the premiums should be higher. It is clear from all this that the importance of an aural examination of individuals presenting themselves for insurance cannot be overrated, and I think it highly important in these days, when grippe has so multiplied our cases of otitis, that more attention be paid to this feature of life-insurance examination.

Paracentesis. I do not want to be understood, with reference to this question of paracentesis, as advocating immediate paracentesis as soon as we encounter a case of otitis media acuta, for we all know that it is practically impossible perhaps to do an aseptic operation, and we always run the risk of transforming what might be a sterile exudate into an infected exudate. As long as the pain is bearable and there is no fever, and the color of the membrane is rather suggestive of a serous than of a purulent exudate, our treatment should be expectant; but when the pain becomes unbearable, preventing sleep, and when fever is present we can rest assured that nothing short of a free incision of the membrane is going to do any good. As regards this question of incision of the drum membrane, Burkner[1] makes some interesting statements which are based upon an exhaustive clinical study. He shows conclusively that cases in which incision of the drum membrane is done, early healing results far more promptly than in those cases in which the spontaneous rupture is allowed to take place. This accords entirely with my own experience. For example, 49.5 per cent. of the cases in which early paracentesis was done were well in five days, while only 5.4 per cent. of the cases which had ruptured spontaneously were well. He gives further data in this connection, which show that with the first twenty days 90.5 per cent. of the cases were paracentesis was performed had recovered, while of those which had been allowed to go on to spontaneous rupture only 43.4 per cent. had recovered. A study of his tables brings out the interesting fact that disturbances in function are far less frequent in cases where paracentesis is done than in the other set of cases. Relapses occurred in 8.5 per cent. of cases in which paracentesis was done, while in the cases in which the membrane ruptured relapses occurred in 20.7 per cent. But above everything else we must note this point: In cases where paracentesis was performed mastoid complication was met with in 1 per cent. of the cases, while this complication was seen in 7.4 per cent. of the other class of cases. I note, too, that in fourteen cases in which paracentesis was not performed the perforation never healed over, while in the other set of cases in which paracentesis was performed the perforation invariably closed. Burkner's observations are of great value, and they strengthen me in the opinion I have long held, that in all cases of otitis media acuta in which the pain is severe and the fever high, and which are accompanied with more or less bulging of the drum membrane, the sooner we incise the drum membrane the better from every point of view.

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[1] Deutsche med. Zeitung, December, 1903.

Now as to the other side of this question. Zaufal[2] expresses himself in no uncertain language. He is no friend of this operation, and bases his reasons upon the assumption that acute inflammation of the middle ear follows a clearly defined course; in other words, is cyclic in character.

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[1] Archiv für Ohrenheilk., Heft 3 and 4.

[2] Zeitschrift für Ohrenheilk., April, 1904, vol. xlvi.

When the bacteria which are present have reached their highest point of development, and the territory upon which they have been feeding has, so to speak, been drained of its nutritive properties, there occurs first, as in pneumonia, a subsidence of the inflammatory phenomena with disappearance of the temperature. The author has never been able to observe this cyclic evolution in a non-complicated case of middle-ear inflammation, and one should not, he thinks, interfere with this natural evolution by a paracentesis. When he had observed this cyclic course of the temperature he has been able to establish the presence of a pneumonia.

The Influence of the Cure of Suppuration of the Middle Ear upon Concomitant Mental Disturbances. At the meeting of the French Otological and Laryngological Society, held last May, there was an interesting communication upon this important subject by Toubert, of Paris. It will be remembered, perhaps, that Albert Robin touched upon this point twenty years ago, and since then there has been silence on this subject. Bouchut, Ménière, Williams, Catlett, Ball, and others have reported instances where the cure of an otitis which was associated with mental trouble was followed by distinct improvement, and even in disappearance of the mental trouble. In this connection Toubert recently reported two cases, both affected with otorrhœa, and in both cases the mastoid was opened according to the method of Stacke. He thinks a suppurating ear is undoubtedly a focus of irritation for the brain, espepecially when there is a strong tendency to mental trouble. Furthermore, this same focus can be the cause of disturbances in the neighboring circulation, or can be the source of origin of toxins harmful to the nervous system. A study of Toubert's observations would seem to indicate that in a certain proportion of cases disappearance of mental trouble has undoubtedly been brought about by the cure of a concomitant ear affection. Toubert suggests the possibility of a mechanical action, and thinks that several of the cases recorded could only be explained in this way.

I have in mind two cases where the individuals were excitable and peculiar to a high degree; indeed, in one case amounting almost to what is known as "flightiness." One of them was a woman aged thirty-five years, and the other a boy aged sixteen years. The boy had suffered from pretty constant otorrhœa for ten years, and the woman had had the same experience for seventeen years. The woman's disposition has been entirely altered since her recovery, and her manner has lost all its conspicuous excitability and nervousness, and her appearance now is that of a well-poised and healthy woman after three years, while the boy's development not only mentally but physically may be said to have started with the cure of his otorrhœa. Indeed, I think the matter of sufficient importance to warrant operative measures upon inmates of insane asylums who happen to be suffering with a chronic otorrhœa which antedates the appearance of the mental trouble.

Rhodan. It may be remembered that two years ago I reviewed the work of Jürgens on the occurrence of rhodan in the saliva. He found that in both the acute and chronic forms of suppuration of the middle ear the test for rhodan was negative, and the same results were obtained in acute and subacute inflammations of the middle ear. Positive rhodan reactions were only obtained in those cases where the condition of the ear was normal and where acute troubles had terminated favorably. To sum up his results, it was shown that the reappearance of rhodan in the saliva in cases of middle-ear disease indicates the beginning of recovery, and so long as this substance is absent from the saliva the middle-ear disease cannot be regarded as cured. The practical value of all this is obvious, as I pointed out in reviewing the earlier contributions of this writer. It seems to me to be a reliable method of ascertaining what progress toward recovery has been made by our treatment in this class of cases. His recent investigations fully confirm his earlier observations, and the test may be used in the course of our treatment to show just how we stand with regard to a cure; in other words, whether the condition is better or worse. When rhodan is unmistakably present in the parotid secretion of the affected side, it shows that the ear trouble on that side is well. When the test fails to show the presence of rhodan we have either a very serious or at least a very chronic suppuration of the middle ear. A weak rhodan reaction shows improvement, and may be a very useful guide. In cases of middle-ear inflammation where the disease has apparently run its course, and the perforation has healed over, if the rhodan fails to make its appearance we may be quite sure that there is trouble still lurking somewhere in the middle ear and the reappearance may be looked for sooner or later. The fact that we can avail ourselves of this test in cases in which it is very difficult to make use of an otoscopic examination certainly enhances the value of this diagnostic measure. Jürgens mentions the interesting fact that he examined the secretion of the parotid on the healthy side as well as the secretion of the opposite side, and where the middle-ear trouble had lasted for a long time and was rather serious in character, the rhodan was found present on the healthy side as well. There seems to be no way of determining what degree of inflammation produces this result, and he records a case where the rhodan reaction was stronger on the so-called healthy side than on the side of the affected ear. I feel sure that this test can be utilized to great advantage, especially in little children, where we are so often unable to successfully conduct an otoscopic examination.

General Treatment in Otitis Media. In the first place, an individual who is affected with an acute suppuration of the middle ear should drop all work and submit to a rigid hygiene, and I have always regarded rest in bed as of the highest importance. The great value of this latter measure is seen in the striking difference in the results of treatment of the rich and the poor. Members of the former class can be kept in bed and they get well with comparative promptness. The diet must be considered just as we consider this question in any other febrile condition. As regards internal medication, I simply treat symptoms. Sleep I induce by giving small doses of heroin, and make it a rule to see that the patient has regular stools. In children I think this is best effected by the citrate of magnesia. As an anodyne I have found a mixture of antipyrin and heroin a valuable one. It may be, as Lermoyez says, that acute inflammation of the middle ear is communicable, and I usually keep my patient in a room alone, and under no circumstances let another child sleep in the same bed.

The Home Treatment of Acute Suppuration of the Middle Ear. It seems to me that the method suggested by Beck[1] is a practical one, and not only would be useful to the patient as a so-called home treatment, but could be well used in office work. The armamentarium consists of a glass tube filled with sterile gauze strips and provided with a little beak at the top, which acts as a retractor for the tragus and also for the probe to get hold of the gauze. A whalebone probe, somewhat flexible at the end, is introduced into the tube, catches the gauze, and carries it well down into the canal, and in this way the canal is packed and kept comparatively dry. Beck's original intention was to thus facilitate the treatment of such cases at home by providing the patients with these little tubes filled with either sterile or medicated gauze strips.

Chronic Aural Catarrh. According to Grünert, the therapy of chronic middle-ear catarrh lies in internal medication. This opinion is based upon pathologico-anatomical changes. At any rate, all of us are daily confronted with disappointments in treating these cases with catheter, bougie, pneumomassage, pressure sound, and what not, and chronic middle-ear catarrh still remains "crux medicorum." The anatomical changes consist for the most part in the formation of new bone tissue throughout the ossicular chain. It will be remembered that some years ago I called attention to the fact that *thiosinamin* had been tried with benefit in this class of cases, its good effects being due to its well-known property of causing the absorption of exudates in tissues. Sugar[2] has recently taken up this question, and again employed thiosinamin in the treatment of this usually intractable class of cases. I need not go into the details of the cases, but will briefly relate Sugar's experience. He employed thiosinamin in eight cases of chronic middle-ear catarrh associated with negative Rinne, loss of lower tones, and prolongation of tuning fork through bone conduction, and in two cases of adherent tympanic membrane, following suppuration of the middle ar. In two cases of middle-ear catarrh and in one case of adherent drum membrane he injected once daily through the catheter five to six drops of the aqueous glycerin solution (10 per cent.) of thiosinamin. This was kept up for three weeks, at the end of which time it was clearly shown that not only had the drum membrane regained its mobility, but that the hearing had improved and the subjective noises diminished. In seven cases he injected a 15 per cent. alcoholic solution (three minims at a time) three times a week in the region of the mastoid process, and this was gradually increased until a complete syringeful was used, and then the injection was made into the upper arm, as this region was better suited for large injections than the rather thin, loose tissue in the mastoid region. When this stage was reached he made the injections every day, and kept it up for four weeks. No unpleasant results were noted beyond a slight burning in the neighborhood of the injection. He generally prefers to inject the 10 per cent. aqueous solution into the middle ear through the catheter, as the alcoholic solution causes very intense burning in this locality. Except in inflammatory conditions he is of the opinion that thiosinamin stands high as a remedy. One will certainly be struck with the remarkable improvement obtained in the hearing of some of his patients. In reporting on this subject three years ago I referred to the fact that I had noted unmistakable and permanent improvement in several cases of chronic aural catarrh in which I had used the drug in doses ranging from one-half to two grains three times a day. I have never, however, used it hypodermically, and I can readily imagine that this method would heighten its effectiveness. It seems especially indicated in the adhesive forms of middle-ear catarrh, in conditions where we have cicatrization following an old suppuration of the middle ear. The few cases which have been reported by Sugar speak strongly in favor of thiosinamin, and it is to be hoped that fuller experience will only serve to strengthen his opinion of this drug.

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[1] Medical Recorder, January, 1904.

[2] Archiv für Ohrenheilk., vol. lxii., Heft 3 and 4.

Myringotomy as a Means of Improving the Hearing. Operative measures in this class of cases (chronic aural catarrh) have long been practised, but with indifferent success, and while such men as Gruber, Politzer, Lucae, and others recommend operation I have never discovered any enthusiasm in their utterances on the subject. In 1898 Moure, on the basis of a series of observations, concluded that cases of middle-ear sclerosis which had resisted the usual treatment might be benefited by paracentesis, and in certain cases complete removal of the tympanic membrane had been followed by improvement in the subjective noises. Stefanowski[1] has been trying various forms of treatment in these cases, and he has tried, among other things, the effect of myringotomy, where the usual and stereotyped methods have failed. He reports a long series of cases from a study of which the following conclusions may be drawn. The operation seems to be entirely free of danger, and he advises its more frequent performance as a relief not only of the tinnitus but also as a measure calculated to improve the hearing. It is interesting to note the fact with reference to this last point that in 62.5 per cent. of his cases he obtained improvement in the hearing, and in 12.5 per cent. he obtained a complete cure. Miot, in his statistics, records improvement in 83.3 per cent. of his cases. One is impressed with the great improvement which these observers usually obtained in the tinnitus. The vertigo also was either completely gotten rid of or markedly ameliorated, this improvement showing itself in either a lessening in the number of the attacks or in feebler intensity of the attacks, and also in entire disappearance of the nausea and vomiting. The earlier the operation is performed the better. In only two cases did he find it necessary to remove a part of the hammer and the entire drum membrane, and in both of these cases he obtained a successful result. In all the cases the healing process ran a satisfactory and an uneventful course. In several of the cases which he examined as long as two years after the operation there was no closing up of the perforation. Of course, it is impossible so soon to estimate the permanency of the improvement, but it has been shown sufficiently well that the tendency of the operation is to do good, and that it is fraught with no danger to the patient. The fact is noted that the majority of his cases were men. In cases where a negative Rinne was obtained—that is to say, where the patient heard sound better through the bone than through the ear—he thinks that the prospect of getting improvement is very good, while cases of positive Rinne he rejects. I need not call attention to the importance in such an operation of getting asepsis of the field of operation or auditory canal. This may be best obtained, I think, by filling the canal for a certain length of time with pledgets of cotton soaked in an alcoholic solution of boric acid. Stefanowski gets anæsthesia of the operative field by soaking a small ball of cotton in cocaine and adrenalin solution, and allowing it to rest on the drum membrane for ten minutes. He makes the myringotomy by piercing the membrane in the lower and posterior segment. The opening is enlarged, if necessary, and the incision is carried right down to the periphery of the membrane, then upward along the periphery of the posterior border of the membrane, then across to the manubrium, and from this point straight down to the place where the incision was started. This flap is removed. The edges of the membrane are then cauterized with chromic acid. If after eight days no improvement has set in he removes a part of the hammer and gradually all of the membrane. Stefanowski gives the records of a number of cases, and from the results which he obtained in these cases I am induced to think that considerable benefit might result from myringotomy in certain selected cases. There is nothing to indicate that the operation with ordinary precautions is at all risky.

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[1] Archiv für Ohrenheilk., vol. xlii., parts iii. and iv.

Hot-water Douche in Chronic Aural Catarrh. Head[1] has found the use of the hot-water douche of great service in this class of cases. We all know, of course, of the treatment with the hot-air douche, but I am unable to find evidence to show that this method has accomplished much. Head's method is certainly worthy of trial. The treatment, as suggested by Head, is left entirely in the hands of the patient. The water used should be as hot as it can be borne without burning, and the technique is as follows: Either a specially small tip is ordered or a straight medicine dropper may be inserted into the tube of the fountain syringe. The fountain bag is hung from eighteen to twenty-four inches above the ear, or just high enough so that the water will be surely carried to the drum membrane. If the tip be small and the bag not too high two quarts of water will run for about ten minutes, and will remain hot for that time. It must be insisted that the patient feel the continual impact of the stream of water against the membrane, for it is easy for the ingoing and outgoing streams to neutralize each other so that only a small portion of the water reaches the membrane. He suggests that the treatment be used once a day, ten minutes for each ear. When the patient complains of dizziness from the injections the force of the water may be too strong or the water may be too hot or the treatment too long. These points must be kept in mind. In some cases he has used a demulcent solution to get rid of the dryness which is often seen in the external auditory canal after frequent washings.

But after all is said and done I must confess that nothing of any striking importance in connection with the treatment of chronic aural catarrh has been brought out during the past year, and the outlook is still quite unpromising. The mechanical treatment of these cases with time will probably be seen to play a more prominent part. I refer to massage. I cannot see, however, that in the many so-called improvements in the shape of masseurs we have gotten anything more satisfactory than the ordinary pneumatic speculum. The pressure probe or sound of Lucae in my experience is distinctly disappointing, and long-standing adhesions successfully withstand the attacks of both pressure probe and bougie. Goldstein[1] has found a 10 per cent. solution of camphor-menthol in benzoinol among the most valuable of the various agents for medicating the aural tract. A few drops of this solution may be injected through the Eustachian catheter and forced by compressed air into the tympanic cavity. Iodine, carbolic acid, and glycerin may be used in the same manner. I do not agree with Goldstein, however, in thinking internal therapeutics of little value. I have usually found that strychnine and iron were beneficial in these conditions.

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[1] Journal of the American Medical Association, November 12, 1904

THE MASTOID.

The Question of Heat or Cold in Mastoiditis. Experience has taught us that the question as to which is better in mastoiditis, a hot or a cold application, is often satisfactorily decided by the patient. Some can only stand heat and others only cold. It is recognized generally that the favorable action of cold applications is best seen in the early stages of the disease—that is to say, in the presuppurative stage. I have long been a believer in the value of cold applications in a threatened purulent mastoiditis, and I have warded off many an operation by the continued application for hours of the ice-bag. Alexander[2] has been experimenting with the apparatus of Allemann, which the latter described about two years ago in the *Wiener klinischer Wochenschrift,* 1902, No. 21. It consists of a system of tubes which are somewhat larger than those in the Leiter coil. The patient should, of course, be in bed, and the applications should last from one to seven hours. The temperature of the water should range from 44° to 46.5° C. He reports eighteen instances of acute mastoiditis which were treated after this method. In all the cases there was suppuration of the middle ear, pain on pressure over the mastoid, and retroauricular swelling. In eight cases the symptoms entirely disappeared. In seven cases the pain was subdued, but operative interference was found necessary. Three of the cases could not endure the application. The observations show us that where surgical intervention is necessary in cases where there is suppuration heat is well borne, though it does not pretend to accomplish recovery. In the first group of eight cases where the symptoms were entirely dissipated Alexander thinks there was undoubtedly pus in the mastoid cells; at the same time one cannot affirm positively that there had been resorption of a commencing suppuration. Allemann, in the case of domestic animals, has obtained complete disappearance of purulent masses in the first stage of their development. The question is whether the same effect could be gotten in the case of man. Keiper[1] has submitted this question of heat or cold to a large number of otologists, and there is a slight majority in favor of heat. I miss, however, in his statistics the names of some whose experience it would be well worth knowing.

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[1] Interstate Medical Journal, October 19, 1904.

[2] Monatsschrift für Ohrenheilk., 1903, No. 9

Apropos of this very question I might refer to a very excellent paper by Snow[2] on the value of ice in the early stages of mastoiditis. I am not sure that, as he states, more than 50 per cent. of our external operations can be avoided, but I am convinced that operations upon the mastoid are much too frequent. Snow lays much stress upon a point to which I have often referred in these pages, namely, the importance of a free incision; in other words, the establishment of free drainage, for without this antiphlogistic measures, whether they be heat or cold, will probably prove fruitless. Personally I am in favor of cold as opposed to heat, and I think the best way to apply the cold is in the Sprague ice-bag, which is a valuable addition to our armamentarium. Snow advises the uninterrupted use of the ice-bag. There should be no marked intervals in the renewing, as often happens in our hospitals, where the nurse takes the bag away to refill it, but is interrupted by a call from another patient to which she attends. He often keeps the parts under this constant low temperature until the discharge ceases. He reports no relapse except in a case of tertiary syphilitic trouble. In several severe cases he effected a cure in six days. Personally I must say I have never used the ice application for more than forty-eight hours, for I have usually felt that all the good that could be done by such an application would be accomplished in this length of time, and, furthermore, I have been somewhat afraid that symptoms of serious trouble might be masked by a long-continued application of the ice-bag. In this connection Richards reports a case where free incision of the drum membrane was followed by application of ice. The trouble as a result of this treatment apparently subsided for a few hours, when an operation was found necessary and the bone was found broken down. The superficial cells were involved, and the antrum had drained out. The ice had masked the infection in the superficial cells and in spite of every effort the patient died.

Neuralgic or Condensing Mastoiditis. In this form of mastoiditis we have the following important features. We find violent and persistent neuralgia of the affected side generally involving the frontotemporooccipital region. There is an absence of the external signs of mastoiditis, with the exception of the mastoid pain on pressure. The absence of any relation between the intensity of the pain and the condition of the ear is very striking. In discussing several cases of this character, Augièras[1] alludes to the fact that ever since the crisis of the neuralgia had necessitated surgical interference the otorrhœa had ceased and the drum cavity had completely healed. A noteworthy fact to which this observer calls our attention was the resistance of the neuralgia to all the usual remedies employed for earache, and, furthermore, the great hyperæsthesia of the ear as evidenced by exacerbations of pain after instillations of analgesic solutions, no matter how little irritating. We have also considerable general depression showing itself in insomnia, loss of appetite, etc. He is also struck by the rapidity with which all symptoms disappear after an opening is made into the mastoid. I have mentioned this as having been the experience of several other observers. An inspection of the bone after it has been opened shows that we are dealing with a condensing osteitis, in its different stages, without any trace of suppuration. The neuralgic pains are explained by the compression of the nerve elements in the condensed osseous tissue. It seems to be a condition which *per se* demands the so-called mastoid operation irrespective of the actual condition of the ear, and this operation, according to Augièras, ought to take in the greater part of the external wall of the mastoid, and he advises the removal as far as possible of all the condensing osseous tissue.

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[1] The Laryngoscope, December, 1903.

[2] Journal of the American Medical Association, January 2, 1904.

INTERNAL EAR.

Labyrinth. We are not infrequently presented with cases which present puzzling symptoms, and when it is of considerable importance to get a proper idea of the trouble. I know of no aural affection where we are more apt to be led astray than in involvement of the labyrinth. We must distinguish between the two symptoms of a labyrinthian affection according to the point involved and symptoms which are excited in other organs which are in more or less close communication, as, for instance, irritation of the brain cavity. The character of the temperature has a very important bearing in this class of cases. The sudden appearance of labyrinthian suppuration can be indicated by collapse with subnormal temperature. Fever in these cases is probably due to a retention of pus. It should be remembered that all the functions of the labyrinth are not affected at the same time. The trouble in gait usually precedes the disturbance in hearing. If the pus has made its way into the vestibule the hearing can persist a long time, but when the vestibule has been opened, as, for instance, in the course of an operation, according to Brieger,[1] deafness invariably follows, and the same author calls attention to the fact that with the Weber test at the beginning of the suppuration the sound is heard best on the side of the healthy ear. Disturbances in equilibrium may be absolutely wanting not only when the cochlea is involved, but even when the suppuration has extended to the semicircular canals. Generally speaking, the vertigo is accompanied with nystagmus, and both these symptoms may disappear as a result of lumbar puncture. Brieger gives the following hints as to the treatment of this class of cases—hints which I think are of value. Of course, operative treatment is practically all that can be done or ought to be done; but sometimes these cases get well spontaneously, by the formation of either granulation or osseous tissue. The operation should be undertaken if in the course of an otitis media suppurativa there appear either symptoms of collapse or increased temperature, disturbances in equilibrium, with nystagmus and rapidly increasing deafness. I need not give the technique of the operation, as it is sufficiently well known, though not a very frequent measure.

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[1] Annales des maladies de l'oreille, etc., June, 1904.

When we come to the surgery of the internal ear, I must confess that I have found nothing in the literature of the past year to change my opinion, namely, that this branch of surgery is still in its infancy. Botey[2] has recently met with some experience in this field, and I think his cases worthy of comment. All of the cases which he reports were characterized by pretty much the same symptoms, that is to say, the symptoms which we usually meet in chronic suppuration of the middle ear, in addition to labyrinthian symptoms. All of them were operated upon. A study of these cases would lead one to conclude that where there is pus in the labyrinth subjective noises do not constitute a very constant symptom, although it must be regarded when present as a very early symptom, and certainly an ephemeral one, and this is probably due to the fact that the organ of Corti and the peripheral neurones are more apt to be destroyed than the neuroepithelial terminations of the auditory nerve in the vestibule and semicircular canals. Taking into account the small volume of the membranous labyrinth, its involvement ought to be almost total, and by the rapid diffusion of pus throughout the cochlea the deafness should be total. This is based upon a study of Botey's three cases, though it is contrary to the views held by Jansen and Hinsberg. Careful study not only of the ear, but also of the course of the disease and of the appearance of the disturbances in equilibrium which are so characteristic, does not indicate beforehand with any certainty the existence of pus in the labyrinth, nor during the act of operation can we either affirm or can we deny that we are dealing with pus in the labyrinth. The channels or orifices of communication of the middle ear with the external ear in cases of suppuration of these regions are nearly always very small, and they can easily escape observation. He advises opening of the entire labyrinth and extensive removal of the parts, even in cases where the pus is confined to the interior of the external semicircular canal. In this way we not only get good drainage, but the pus cannot spread into the interior of the nooks of the labyrinth. In cases where there is some doubt, particularly where there is some perception of sounds in the affected ear, Botey advises atticoantrotomy, and then he waits for four or five days. If after this lapse of time the labyrinthian trouble persists with the same intensity, one is justified in opening the labyrinth, which is apt to be found infected. Botey lays no stress on the nystagmus which occurs quite often from accidental injuries of the horizontal semicircular canal. He does not regard extensive opening of the labyrinth as a dangerous procedure, putting the mortality below 4 per cent. A labyrinthian fistula which is unaccompanied with vertigo, or other subjective symptoms, such, for example, as tinnitus and deafness, does not warrant extensive opening, and on this point he agrees with Jansen and Hinsberg. In these cases it is simply necessary to enlarge very carefully the opening of the fistulous track, without troubling the membranous labyrinth, and in removing whatever granulation tissue we find, and in searching diligently for any possible focus of pus. At the end of three or four months, when the whole operative cavity is well covered with skin, if there be still a discharge of pus from the channel of communication between the middle and internal ear, and there is also vertigo, it is best to make an extensive opening; but if there exists no fistulous track after epidermitization of the operative cavity, we will be warranted in considering the cure complete. Botey goes on to show that pus can be present in the labyrinth without disturbances in equilibrium, and in such cases operation alone will demonstrate its presence. It is most certain that the labyrinth has been destroyed and that we will have complete deafness. Even where labyrinthian symptoms are present and the Stein test shows disturbance in locomotion, it does not necessarily mean that the labyrinth is destroyed. Botey's contribution is a very interesting one, and his suggestions as to treatment are practical and valuable.

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[1] Annales des maladies de l'oreille, etc., August, 1904.

[2] Ibid., December, 1903.

MISCELLANEOUS.

Lesions of the Organ of Hearing Due to the Detonations of Firearms. This interesting subject has been specially studied by Professor Ostino[1] and with especial reference to rupture of the tympanic membrane. According to most writers it is supposed that the rupture is produced by the sudden increase of atmospheric pressure. Ostino thinks that this factor is insufficient, as is shown by the experiments of his assistant, who established the fact by means of a manometer that the pressure of air produced by a cannon at the height of the cannoneer's ear is exceedingly slight, and he thinks there is another factor, the so-called sonorous vibration. The vibrations which accompany an explosion are reflected in part on the membrane and in part are transmitted to the labyrinth. We must remember that when cannons are fired not only do houses and even the earth tremble, but glass is shattered—a fact which proves that vibrations can cause rupture of the drum membrane. He discusses the question of predisposing causes, among which he places the peculiar vulnerability of the labyrinth caused by syphilis, the weakness of the tympanic membrane caused by old suppurative processes which have been cured, tubal stenosis, etc. Ostino agrees with Nimier in thinking that perforations of the tympanic membrane do not constitute a predisposing cause. Of course, either the functional or objective disturbances depend more or less upon whether the ear was originally a healthy or a diseased one. For example, if we have an ear which is affected with syphilis or one in which there is tubal obstruction, we will get as a result of a detonation the symptoms of labyrinthian trouble. This variety of disturbance, according to Ostino, is found most frequently among old artillerymen. Examination of the membrane immediately after the accident shows a more or less diffuse redness of and sometimes a little hemorrhage in the membrane. In cases where the ear has been the seat of syphilis the prognosis is very bad, and somewhat less bad in cases where we have a chronic aural catarrh. Naturally, the treatment would consist in keeping individuals who have had any sort of ear disease away from artillery practice. He refers to the usual methods of nullifying the effects of sound by putting tampons in the ears, and he regards them as more or less unsatisfactory, as they prevent the commands from being heard. Ferrand has constructed a little apparatus which is attached to the auricle, and which has some advantages over the measures usually employed. In cases in which perforation has occurred it seems to me that we should treat the condition just as we would had the perforation resulted from an ordinary acute inflammation of the middle ear, and the same may be said of the graver cases, such, for instance, as in the event of the complications mentioned above.

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[1] Giorn. med. del. R. esercito, 52 année, May, 1904.

Symptoms of Leptomeningitis of Aural Origin. We all know the great difficulty often met with in interpreting some of the symptoms originating in a middle-ear suppuration. How often we get symptoms which point strongly to a cerebral inflammation and operation reveals nothing abnormal! Gradenigo[1] has observed a special train of symptoms in some of these serious cases, and when they are present we may decide upon the presence of a circumscribed leptomeningitis. The symptoms are as follows: very intense pain not only in the ear, but also on that side of the head, with the pain localizing itself preferably in the temporoparietal region. After a period of time, varying from twenty days to two months, that is to say, from the commencement of the otitis, there appears a paralysis or paresis of the oculomotor on the affected side without other ocular symptoms.

Tobacco and Hearing. I do not know that any literature exists to show that tobacco has any specific influence upon the organ of hearing. We all know that pharyngeal troubles may be aggravated by constant smoking, and in this way middle-ear catarrh may be made worse, but I think it is generally conceded that tobacco does not work upon the auditory apparatus, as it does, for example, upon the visual. In this connection Delie[2] has made some interesting observations, reporting in all ten cases. The principal symptom is deafness coming on and becoming worse in a lapse of time relatively short, associated with all sorts of subjective noises, vertiginous phenomena, etc. The latter symptoms are not constantly observed, and are usually late manifestations, and are not so distressing as when seen in other aural affections. The objective examination throws no light upon the diagnosis. The results were particularly disastrous in young people affected with sclerosis of the middle ear. The nicotine seems to exert its influence directly upon the acoustic nerve, and brings about circulatory disturbances, as a result of exciting the sympathetic. At the same time it engenders and accelerates the development of a trophoneurosis. He advises moderation in the use of tobacco, and he considers it especially harmful in individuals who are affected with ear trouble, and also in persons who are predisposed to sclerotic changes in the ear through heredity.

Accidents to the Ear in Travelling, and their Significance. It is clear that the importance of this subject has not been so clearly recognized as it ought to have been, though laws bearing upon this point do exist. Accidents of this character are met with in travelling on railroads, in carriages, automobiles, and in explosions in mines, etc.

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[1] Rev. heb. de laryngologie, d'otologie, etc., September, 1904.

[2] Ibid., August 27, 1904.

Often the lesion passes unnoticed, because there is no external evidence of such a lesion, and because the symptoms of cerebral concussion mask all other symptoms, and the consequence is that a medicolegal examination is tardy. The trouble manifests itself by deafness or even by morbid acuteness of hearing, diminution in vocal sonorousness, subjective noises, and vertigo, accompanied with other manifestations of traumatic neurasthenia. One of the ears is ordinarily more affected than the other, and the internal ear is principally involved. The diagnosis is, according to Castex,[1] very puzzling when there is a history of previous ear trouble. Simulation is possible, but rare, and, as is well known, there is a strong tendency in this class of patients to exaggerate. Castex is of the opinion that the prognosis is grave, for while the vertigo and subjective noises often disappear, deafness persists, and repeated examinations at long intervals should be made of these individuals. After all, the surest way of ameliorating the condition of this class of persons is to give them satisfactory damages, as the usual methods of treatment for the same lesions from other causes is usually futile. In making a medicolegal report upon such a case he advises that the exact nature and degree of incapacity should be touched upon, and mention should be made whether the condition is partial or temporary or permanent.

Lumbar Puncture. I have alluded in previous reports to the value of lumbar puncture in certain ear affections, particularly labyrinthian. Babinski[2] has made several communications on this subject, and he may be regarded as the chief representative of this therapeutic measure. More recently he reports 106 cases, in which 32 were affected with vertigo. Among these 32 the result of the treatment in 11 cases was negative. As regards the other 21, 7 were cured, or at least they were relieved of their vertigo; 3 of these were genuine labyrinthian troubles; 2 were old cases of suppurative otitis media, which had healed up, leaving behind a more or less cicatricial drum membrane, and the remaining 2 were cases of middle-ear sclerosis. Unfortunately the author does not give any data as to the result of the functional examination, either before or after the lumbar puncture. In 4 other cases (2 of which were labyrinthian and the other 2 sclerosis of the middle ear) there had been no vertigo three months after the lumbar puncture. Seven cases had been lost sight of a few days after the operation; 3 patients reported that they had been temporarily helped. Among 90 individuals who were suffering with subjective noises, 30 were improved or cured. In 100 cases where deafness was found, 13 heard better after the lumbar puncture. It is

[1] Rev. heb. de laryngologie, etc., August 24, 1904.

[2] Annales des maladies de l'oreille, etc., February, 1904, No. 2.

clear that this procedure has a pretty definite effect for good; at least, the tendency is to improve the patient's condition. This effect is markedly seen in aural troubles of which vertigo is a prominent symptom. The operation seems less effective in cases characterized especially by tinnitus and deafness, and, generally speaking, the best results were seen in labyrinthian troubles.

Chevasse and Mahu[1] have also made an exhaustive study of the effects of lumbar puncture on the endocranial complications of suppuration of the middle ear, and I am much inclined to think that it can be regarded as at least a very valuable means of diagnosis, and when made without aspiration, without general anæsthesia, and in the recumbent position it seems to be a harmless procedure. It is, of course, necessary in making a clinical study of this character to take into account the positive as well as the negative results, and we ought not to lose sight of the fact that in certain general diseases there is a marked change in the character of the cerebrospinal fluid. In the great majority of cases a thick or even clear liquid containing, after centrifuge, either bacteria, polynuclear leukocytes, or these two elements combined, indicates the existence of an infectious meningitis. In extradural and subdural suppuration the cerebrospinal fluid preserves its normal composition as long as the arachnoid sac is not subjected to irritation. In cerebral abscess, in thrombophlebitis of the lateral sinus, and in serous meningitis, the liquid is clear and normal. After traumatic lesions of the labyrinth or of the base of the skull, with aural symptoms, one will often find red globules in the cerebrospinal fluid. It is evident, however, from a study of these observations that the therapeutic value of lumbar puncture is uncertain, but in view of the results reported it is advisable to combine it at least with surgical intervention in cases of meningitis, certainly as long as the situation does not appear, clinically speaking, desperate.

The measure will at least demonstrate the curability of certain forms of meningitis. Among otologists in America lumbar puncture has not yet found any footing to speak of, though a study of foreign literature would lead me to conclude that much useful information, if not actual therapeutic benefit, might be obtained from recourse to this procedure. Apropos of its use as a therapeutic measure, I might refer to the communication of Trétrôp[2] at the last meeting of the Belgian Otological Society. He reports his own results. The quantity of spinal fluid which was removed varied from 6 c.c. to 17 c.c. (fʒiss to fʒv). The pain amounted to nothing, and the functional results have certainly been encouraging so far as the subjective noises and vertigo were con-

[1] Annales des maladies de l'oreille, etc., 1903, No. 11.

[2] Rev. heb. de laryng., etc., July 23, 1904.

cerned. As regards the deafness, he obtained results in three cases which, to say the least, were startling. A young girl, aged sixteen years, completely deaf and subject to headaches, nausea and vertigo, actually heard the watch at 40 cm. In the second case the woman had been deaf for fifteen years, and was also a sufferer from vertigo and subjective noises, and she also was much improved. The third case was even more remarkable. The patient was totally deaf in one ear, and as a result of the puncture she heard the voice out of the ear which was thought to be lost, and her hearing in the other ear was much improved. It would seem from all this that the so-called Babinski method has already accomplished a great deal in ameliorating a most troublesome train of aural symptoms.

Persistent Perforation of the Tympanic Membrane and Whether this Condition Unfits an Individual for Military Service. Toubert,[1] a military surgeon, discusses this important question. According to this observer persistent perforations of the drum membrane ought only to be taken into account in this connection when they are associated with a chronic affection of the tympanic cavity. Every case should always be thoroughly studied, and the examination should always be made by an otologist. While individuals so affected are in service they should be carefully watched, and it would be well not to allow them to go in swimming, as it is well known that such conditions are often made worse by this form of bathing. In Germany the conditions of inaptitude for military service as regards the ear are still in need of revision. In France, however, a perforation of the drum membrane without otorrhœa is quite compatible with military service, while chronic affections of the middle ear with or without persistent discharge, with or without perforation of the membrane, are sufficient reasons for exemption from service.

Otitic Brain Abscess. I have frequently touched upon this subject in these reports, and have more than once called attention to the great difficulty of the diagnosis. I have cited instances where distinguished neurologists pronounced a given condition one of brain abscess where the symptoms could hardly be interpreted as meaning anything else, but where no abscess was found and the patient recovered. We all know that the drowsiness, absence of fever, slow pulse, and vomiting which are seen in brain abscess can also occur in serous and tuberculous meningitis, and also in brain tumors. Hence a positive diagnosis is practically impossible. Uchermann[2] advises in this class of cases resection of the mastoid, so that the condition of the bone and adjacent dura can be determined. In this way we can determine the presence or not of sinus thrombosis, epidural abscess, and caries of bone adjacent to the dura. When the dura is exposed it usually bulges, but does not pulsate. In the beginning of brain abscess, or even when we are dealing with a small abscess, the symptoms are well defined or maybe they are wanting entirely, thus making a diagnosis impossible, unless the cavity is found accidentally during the operation. In children the symptoms, as can be easily imagined, are very obscure. Fever and vomiting may be present, but these cannot be regarded as characteristic, unless accompanied by other more suggestive symptoms. Toward the last the diagnosis can usually be made, though, as the author says, it is then too late to be of any value. In addition to the inflammatory symptoms of this stage coma comes on suddenly with a rapid rise of temperature, and is soon followed by death. Aphasia with or without associated disturbance of the opposite side points to the probable location of the trouble in the left temporal lobe, while crossed paralysis of the extremities would indicate involvement of the motor areas in the temporal lobe. Local symptoms are so infrequent when the abscess is situated in the cerebellum that in cases of primary disease in the posterior part of the mastoid or in the labyrinth, with symptoms of abscess, the absence of focal symptoms is considered by some to be strong evidence that the seat of the abscess is in the cerebellum. At the same time he cites two cases, one a man aged twenty-six years, and the other a boy aged sixteen years, where there were large abscesses of the temporal lobe, and yet focal symptoms were absent. As to whether we are dealing with brain abscess especially of the cerebellum or with a serous meningitis, Uchermann confesses to the great difficulty of deciding. A history of otorrhœa favors the view that we are dealing with an abscess, but a differential diagnosis is often impossible without exploratory puncture. It is equally difficult to differentiate between brain tumor and tuberculous meningitis with coexisting suppuration of the middle ear. The latter may run its course with elevation of temperature and slow pulse, and in such cases we can only make a diagnosis by resection of the mastoid. If the bone is found to be generally healthy, except possibly in the region of the antrum or the attic, the presence of brain abscess is not very probable. The nature of the meningeal exudate can only be determined by exploratory puncture and microscopic examination. If we are dealing with serous meningitis the puncture is nearly always followed by improvement, but this is not the case when we have a tuberculous inflammation. In cases of middle-ear suppuration, where we are in doubt whether we have brain abscess or tumor, a great deal of importance should be attached to the duration of the development. In tumors of the brain the symptoms develop much more slowly than in abscess, and are generally associated with more marked optic neuritis, which can even amount to a choked disk.

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[1] Der Militararzt, Nos. 1 and 2, 1904.

[2] Archives of Otology, October, 1904.

Blindness, too, is more frequent, while progressive involvement of the cranial nerves is often seen.

The Diffusion within the Brain of Tuberculosis of Aural Origin. Ever since Schwartze made his observations on this subject we have been hearing how easy it is for tuberculosis of the ear to spread itself to the brain. The truth of this statement can only be demonstrated by establishing the coexistence of tuberculous lesions in the contiguous cerebral region without the existence of tuberculous foci elsewhere in the body, and this demonstration would be still more precise if we could indicate with exactness the route followed by the organisms in going from the ear into the brain. The carotid, the temporal bone (showing itself as an ostitis), and the petrosquamous fissure have all been pointed out as possible routes, but it should be remembered that very frequently in autopsies on infants tuberculous foci have been found and foci of the same character in the brain without it being possible to trace the connection. It is probable, however, that the infection was conveyed through the general circulation. The dura ought certainly to be the principal obstacle to the passage of tuberculous material into the brain. Hegetschweiler, in autopsies where tuberculosis of the ear was present, found in sixteen cases involvement of the dura. In one case only was there any perforation of the dura and resulting encephalitis. Not only the dura but the venous sinuses can be affected. Upon the basis of histological examinations of preparations from infants which had died of tuberculosis, Poli[1] is of the opinion that that portion or layer of the dura next to the bone is really the main defence against tuberculous infection, and that the venous sinuses participate in the fortunes of this layer. This non-participation on the part of the internal layer of the dura can only be explained by the fact that it is almost entirely devoid of bloodvessels, and also by the fact that the tuberculous process itself is also rather feeble. It is probable that when a perforation of the dura occurs on contact with a tuberculous point in the bone, it is really caused by a, so to speak, superadded infection more active and, of course, more intense than that which is due to Koch's tubercle bacillus. We may conclude, then, that while tuberculous infection of the brain originating in the ear is possible, it is certainly not frequent.

Changes in the Ear Resulting from the Administration of Salicylate of Soda. I have now and again alluded to the danger of giving quinine in middle-ear inflammation, and many of us no doubt have experienced the uncomfortable aural symptoms which often follow the administration of salicylate of soda. It might be well to bear in mind the fact that either one of these agents produces distinct anatomical changes in the auditory apparatus, and when the latter is diseased it behooves us to administer quinine and salicylate of soda with great caution. Cases are not wanting to show serious if not permanent impairment of hearing from the administration of either of these drugs in the course of an acute suppuration of the middle ear, and the recent experimental contribution of Blau to this question has real practical value. His experiments were made on guinea-pigs and mice. The changes seem to involve the protoplasm of the cell, and particularly the little bodies which have been described by Nissl as located in the protoplasm. These bodies are frequently absent or at least have undergone degeneration. The cells and even their contours lose their distinctness; in fact, we may have complete disappearance of the cells. It would seem that the changes are localized chiefly in the ganglion cells when the animals are subjected to the influence of the drug for any considerable time, and generally we find the changes to be of no slight degree; at the same time the cells do not seem to be equally involved. In the acute cases we have very much the same changes in the ganglion cells, though perhaps somewhat slighter in degree. To sum up, then, these experiments show that the disturbances in hearing caused by salicylate of soda are due to injury of the ganglion cells in the ganglion spirale and vestibular ganglion. I might refer in this connection to the observations of Dreyfuss,[1] who found that quinine paralyzed the functions of the acoustic nerve in both its branches, and he attributes the effect of quinine medication in diseases of the ear to its paralyzing action on the labyrinthian tone—that is to say, we get a loss of sensibility of the vestibular branch of the acoustic.

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[1] Bollett. della R. academia med. de Genova, anno. xviii., No. 3.

Schwabach[2] has recently reported a case where the patient, a young woman aged twenty-eight years, had been taking large doses of a preparation of salicylic acid, and who had become profoundly deaf. She subsequently recovered her hearing after leaving off the medicine.

Gunshot Injuries of the Ear. One of the most interesting contributions of late comes from the pen of Orgebin,[3] and the author discusses in an exhaustive way the injuries of the ear caused by pistol bullets. In none of the cases which he reports did the bullet penetrate the meninges. He discusses in an interesting manner the complications, diagnosis, prognosis, and, finally, the operative indications and treatment generally. He does not regard such injuries as extremely rare. Generally speaking, we have pain and loss of consciousness, primary hemorrhage without lesion of the larger vessels. The most frequent complications are facial paralysis, either compression or section of the nerve; hemorrhage due to opening of the internal carotid, or of the jugular vein, or even of the sinus; labyrinthian complications, or infections which may lead to mastoiditis and cerebral trouble. As regards the diagnosis, one can readily see that we would often be in the dark as to the seat of the bullet, and radiography is, of course, our most reliable guide if the missile cannot be reached easily by a probe. It is interesting to note that in the literature of this subject one will find that there are a certain number of surgeons who believe in abstaining from operative treatment in this class of cases, holding that the traumatism necessary to get at the bullet is often more serious in its effects on hearing than the wound made by the bullet, and that it would be much better to trust to encysting of the bullet. In a case where the ball is visible or at least where it can be touched by a probe, it should be removed. Again, where the ball is invisible and yet giving rise to serious symptoms, such, for instance, as facial paralysis, hemorrhage, and labyrinthian troubles, it seems advisable to remove the ball, but when it is giving rise to no trouble one might as well refrain from any operative interference. These are the fresh cases. There are cases, however, which come to us with a history of bullet wound received months previously, and here we ought to interfere only when the bullet is visible or is giving rise to serious symptoms, such as vertigo, suppuration, or facial paralysis. Where the bullet is in the external auditory canal, or even in the tympanic cavity, we may often get it with ease through the canal, but sometimes it will be necessary to make the retro-auricular incision, and to go into the tympanic cavity from the rear. When the ball is deeply embedded in the mastoid process or the temporal bone, one must proceed in a very cautious manner, as very serious complications may arise from an entrance into the deeper parts. As I have said, little or nothing on this subject has been contributed to otological literature, and this is rather surprising when we consider that bullet wounds of the aural region are not rare occurrences even in ordinary every-day life, to say nothing of the casualties of war. Orgebin's communication, then, is one of the few along these lines, and for this reason added to the thoroughly practical character of the work it may be regarded as of distinct value.

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[1] Annales des maladies de l'oreille, etc., de larynx, etc., October, 1904.

[2] Deutsch. med. Wochenschrift, No. 2, 1904.

[3] Rev. heb. de laryngol., etc., March 19, 1904.

Local Anæsthesia. I have touched upon the subject of local anæsthesia a number of times in PROGRESSIVE MEDICINE. We know that the ordinary solution of cocaine—that is to say, of the strength used for eye operations—is not suitable for operations upon the ear. Gray's solution of cocaine, aniline oil, and alcohol, has done me good service, and I have generally succeeded in opening the drum membrane painlessly since I have employed this solution. Cornet[1] employs with success a solution of chlorhydrate of cocaine in alcohol. I have frequently used solutions of cocaine (10 per cent.) in alcohol, but a fresh solution of the Gray mixture gives, in my opinion, better results. In operations upon the drum membrane it is well to employ a solution of 1 to 10, and the anæsthesia should be kept up for ten minutes at least. After operating with this solution one rarely sees superficial scars of the tympanic membrane. In operating in the drum cavity it is well to clean out thoroughly the pus before instilling the cocaine solution. When the perforation is large and the solution can readily reach the cavity, it is not necessary for the cocaine solution to be stronger than 1:30, but where we intend to perform curettage a 1:10 solution should be employed.

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[1] Rev. heb. de laryngol., etc., September 10, 1904.

Importance of an Examination of the Ears of Children in Acute Diseases. McKernon[1] thinks it highly important that the ears of children who are suffering with acute diseases should be examined, so that the presence of any pathological change may be early recognized and treated. In very young children otoscopic examination is very difficult for those not constantly practising it. The speculum, as I have always strongly urged, should be small, and the auricle should be drawn backward and downward, and in this way we can open the canal and expose the deeper structures. He calls attention to the fact that inspection of the drum membrane (when middle-ear disease is suspected) will reveal no trace of congestion owing to the exfoliated epithelium on its surface, but if the latter is gently brushed with a cotton-tipped probe the white-looking drum will be replaced by a reddened, bulging, and angry-looking surface. Aural complications should be looked for each day, and in a large number of cases which came under his observation there was no symptom of aural trouble until after the damage was done—that is to say, after spontaneous rupture—an event which might always be avoided by constant otoscopy. He suggests that ear complications should always be looked for in acute gastrointestinal affections, pneumonia, grippe, and typhoid fever.

And these observations of McKernon's suggest to us all the importance of an otologist's knowing his general medicine. Cobb[2] makes some sensible remarks in connection with this point. In dealing with these local conditions we shall be doing our patients a great service when we refer them to their family physicians for any disturbance in the general health which may be present at the time they are under our care, and not attempt to treat a systemic condition which the family physician, from long experience with the individual's peculiarities, can handle so much more successfully than we can ever expect to do.

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[1] Medical Record, June 25, 1904.

[2] Journal American Medical Association, December 19, 1904,

INDEX.

ABSCESS, brain, 285
  hepatic, from infected ear, 264
Abscesses, cerebral, 28
    tuberculous, bursting of, into trachea, 89.
Accessory nasal sinuses, 242
Acoustic nerve, neurofibroma of, 34
Actinomycosis of jaw, 68
Adenomata of breast, 109
Administrative control of tuberculosis, 183
Agglutination in dysentery, 136
  in paratyphoid, 137
  of colon bacillus, 137
  of pneumococcus, 136
  of tubercle bacillus, 136
Albumin content of whey, 236
Amyloid goitre, 91
Anæsthesia, local, in ear, 289
    trephining under, 60
Anatomy of facial nerve, 51
Aneurysm, cirsoid, in branches of internal carotid, 84
  extracranial, of internal corotid, 85
  of internal carotid, 83
Angina, diphtheritic, 140
  in syphilis, 140
Angioma of heart, 110
  of pia mater, 34
Antidysenteric serum, 148
Antipneumonic serum, 172
Antitoxin, tetanus, 182
    prophylactic use of, 182
Antral suppuration, 248
Antrum, fibrosarcoma of, 68
  suppuration of, 248
Arrhythmia in scarlet fever, 179
Arteries, thyroid, ligation of, 97
Arteriosclerosis and typhoid, 137
  due to acute infections, 137
Artificial infant feeding, 227
Atresia of nasal passages, 73
Atrophy, bilateral facial, paraffin prothesis in, 69
Auditory canal, external, stenosis of, 259
    foreign bodies in, 260
  nerve, division of, for tinnitus aurium, 48
Aural catarrh, chronic, 272
    hot-water douche for, 275
  discharges in scarlet fever, 177
  herpes zoster, 259
  origin of brain tuberculosis, 287
    of leptomeningitis, 282
Autopsy reports in pneumonia, 165

BACTERIA in milk, 228
  Basal fractures of skull, 23
Basedow's disease. *See* Graves' disease
Benign tumors, metastasis in, 99
Blood changes in measles, 155
  cultures in typhoid, 191
  poisoning from tonsillitis, 252
Brain abscess, otitic, 285
  adhesions, prevention of, 59
  concussion of, choked disk in, 24
  infection, 28
  injuries, morphine in, 25
  operations, hemorrhage in, 61
    osteoplasty in, 61
  sarcoma of, 32
  tuberculosis of aural origin, 287
  tumors and cranial tumors, 29
Breast, angioma of, 110
  cancer of, operation for, 111
  cystadenomata of, 109
  feeding, 225
  fibroadenoma of, 107
  hypertrophied, of male, 102
  male, scirrhus of, 102
  suspicious tumors of involuting, 109
  tuberculosis of, 105
Breasts, supernumerary, 103
Bursæ, subhyoid, 87

CANCER. *See* Carcinoma.
  Carcinoma of breast, 111
      operation for, 111
    of thyroid, 93
      invasion of trachea by, 93
    scirrhous, of male breast, 102
Cardiolysis, 123
Carotid artery, 84
    cirsoid aneurysm in branches of, 84
    internal, aneurysm of, 83
    extracranial aneurysm of, 85
  body, 76
Catarrh, chronic aural, 272
    hot-water douche for, 275
Cavernous sinus thrombosis, 38
Cerebellar tumors, 34
Cerebral abscesses, 28
  hemorrhage, 25
  infection, 28
  injuries, morphine in, 25
  operations, 59
    technique of, 59
Cerebrospinal fluid in fracture of skull, 20
Cervical lymphatic nodes, 80

Cervical sympathetic, excision of, for epilepsy, 58
  resection of, for Graves' disease, 98
Chancre of inferior turbinate, 258
Chemistry and infant feeding, 229
Chest wall, sarcoma of, 125
  wounds of, penetrating the diaphragm, 123
Chickenpox, 155
Children, diseases of, 209
  ears of, in acute diseases, 290
  feeding, after first year, 232
Choked disk in concussion, 24
Chondrodystrophia fœtalis, 222
Chylothorax, traumatic, 129
Cirsoid aneurysm in branches of internal carotid, 84
Cocaine injections, classification of trifacial neuralgia by, 47
Colon bacillus, 137
Complicated cases of scarlet fever, 177
Concussion, choked disk in, 24
  pathogenesis of, 22
Condensing mastoiditis, 277
Conjunctivitis in measles, 156
Contagiousness of pneumonia, 158
Cranial nerves, 39
    in fracture of skull, 21
  sinuses, 38
  tumors, 29
    lumbar puncture in, 29
    surgical aspects of, 29
    treatment of, 29
Craniometer, 61
Craniotabes and rickets, 221
Craniotomies, hæmostasis in, 61
Credé's method, 212
Cystadenomata of jaws, 62
Cysts, dentigerous, 64

DENGUE, 138
Dentigerous cysts, 64
Diaphragm, 123
  wounds of chest, penetrating, 123
Diarrhœa, 145
Diastasis of recti muscles in rickets, 221
Diazo reaction in measles, 154
Diet in typhoid, 204
Diphtheria, 138
  cardiac murmurs in, 143
  diagnosis of, 140
  heart complication in, 142
  immunization against, 139
  intubation of larynx in, 141
  laryngeal, 141
  pulse in, 143
  treatment of, 139, 145
Diphtheritic angina, 140
Diseases of children, 209
Drainage of pericardium, 113
Dura mater, sarcoma of, 33
Dysentery, 136, 145
  serum for, 148
  treatment of, 147

EAR, accidents to, in travelling 282
  affections, lumbar puncture in, 283
  changes from salicylates, 287
  external, 259
    herpes zoster of, 259
  gunshot injuries of, 288
  infected, hepatitis from, 264
  internal, 278
    surgery of, 279
  local anæsthesia in, 289
  middle, 261
    osseous necrosis of, 267
    suppuration of, 262
      and mental disturbances, 270
      gastrointestinal disturbances and, 262
      home treatment of, 272
      insurance and, 268
      rhodan in, 271
      sulphur vapors for, 267
    tuberculosis of, 261
Ears of children in acute diseases, 290
Empyema, treatment of, 126
Encephalitis, œdematous, in epileptics, 58
Endocarditis in mumps, 157
  in pneumonia, 167
Epidemic meningitis, 149
    herpes in, 150
    lumbar puncture in, 151
    lysol in, 152
    treatment of, 151
  of pneumonia, 158
Epilepsy, 53
  excision of cervical sympathetic for, 58
  idiopathic, 54
    focal symptoms in, 54
  Jacksonian, 56
  lesions found in, 55
  traumatic, 54
Epileptics, œdematous encephalitis in, 58
Ethmoid disease, 245
Etiology of rheumatism, 172
Excision of Gasserian ganglion, 45
      occipital route for, 46
      retromastoid route for, 46
Exophthalmic goitre. *See* Graves' disease.
Exophthalmos, pulsating, 83
Exostosis of frontal sinuses, 72
External auditory canal, stenosis of, 259
      foreign bodies in, 260
  ear, 259
Extracranial division of branches of fifth nerve, 47

FACE, 69
Facial atrophy, bilateral, paraffin prothesis in, 69
  nerve, 49
    anatomy of, 51
  palsy, neural anastomosis for, 49
Fats in infant feeding, 232
Feeding children after first year, 232
  infant, 225
    artificial, 227

Feeding infant, breast, 225
    chemistry in, 229
    coagulated cows' milk, 231
    condensed milk, 228
    cows' milk, 228
    fats in, 232
    modification methods, 230
    starch in, 232
Fever in scarlet fever, 177
Fibroadenoma of breast, 107
Fibromata, nasopharyngeal, 72
Fibrosarcoma of antrum, 68
Ficker's modification of Widal reaction, 190
Firearms, relation of, to hearing, 281
Fistula, pulmonary, treatment of, 127
Fistulæ, goitrous, 92
Foods, infant, 234
Foreign bodies in external auditory canal, 260
    in heart, 122
    in œsophagus, 89
    in pharynx, 89
Fracture of skull, 18
    basal, 23
    cerebrospinal fluid in, 20
    concussion in, 22
    cranial nerves in, 21
    hemorrhage in, 20
    temperature in, 22
    treatment of, 22
Frontal lobe, psychical disturbances in lesions of, 26
  sinuses, exostosis of, 72
  sinusitis, Killian's operation for, 249
Fungosity of umbilicus, 214

GALACTOCELE, 104
Gallstones and typhoid, 199
Ganglion, Gasserian, excision of, 47
    occipital route for, 46
    retromastoid route for, 46
Gasserian ganglion, excision of, 45
    occipital route for, 46
    retromastoid route for, 46
Gastrointestinal troubles in infants and middle-ear suppuration, 262
Gauze drain in otitis media, 266
Gland, mammary, 102
    cystadenomata of, 109
    fibroadenoma of, 107
    tuberculosis of, 105
  thyroid, 90
    and marasmus, 224
    metastasis following lesions of, 100
Glands, parotid, mixed tumors of, 78
Goitre, amyloid, 91
  exophthalmic. *See* Graves' disease.
  lingual, 90
Goitres, surgical treatment of, 93
Goitrous fistulæ, 92
Grafting, thyroid, 101
Graves' disease, 96
    operative treatment of, 96
    serum treatment of, 98
    x-ray for, 98
Gunshot injuries of ear, 288

HÆMATOMA, sternomastoid, 215
Hæmaturia in infantile scurvy, 223
Hæmopericardium, traumatic, 114
Hæmostasis in craniotomies, 61
Hay fever, serum treatment of, 239
Head injuries, 17
    hyperæsthesia in, 18
  surgery of, 17
  traumatism to, 17
Hearing and tobacco, 282
  myringotomy to improve, 273
  relation of detonations of firearms to, 281
Heart, 112
  complications in diphtheria, 142
  foreign body in, 122
  in scarlet fever, 178
  lesions in tuberculosis, 185
  massage of, 120
  murmurs in diphtheria, 143
  size of, in tuberculosis, 185
  suture of, 116
  wounds of, 116
    list of, 119
Hemorrhage, cerebral, 25
  in fracture of skull, 20
Hemorrhagic diseases of newborn, 209
Hepatitis from an infected ear, 264
Hernia, umbilical cord, 213
Herpes zoster, 150
    aural, 259
    in pneumonia, 165
Hodgkin's disease, *x*-ray in, 81
Hot-water douche in aural catarrh, 275
Hydrocephalus, 51
  lumbar puncture for, 53
Hyperæsthesia in head injuries, 18
Hypertrophied breast in male, 102
Hypertrophy of lingual tonsils, nervous symptoms in, 256
Hypophysis, injuries of, 27

ICE-BAG in heart disease, 180
Icterus neonatorum, 210. *See* Jaundice.
Immunization against diphtheria, 139
Infant feeding, 225
    artificial, 227
    breast, 225
    chemistry in, 229
    coagulated cows' milk, 231
    condensed milk, 228
    cows' milk, 228
    fats in, 232
    modification methods, 230
    starch in, 232
    systems of, 230
  foods, 234
Infantile scurvy, 222
    hæmaturia in, 222
    treatment of, 223
Infants, gastrointestinal troubles in, and middle-ear suppuration, 262
  newborn, septic infection in, 211
  premature, 216
Infection, house, in tuberculosis, 185
  mode of, in tuberculosis, 184

Infection of brain, 28
Infections, acute, arteriosclerosis due to, 136
    ears of children in, 290
  septic, of the newborn, 211
  serum, diagnosis of, 135
Infectious diseases, 133
Infectiousness of scarlet fever, 177
Inferior turbinate, chancre of, 258
Injections, intratracheal, 251
Injuries, cerebral, morphine in, 24
  of hypophysis, 27
  to head, 17
    hyperæsthesia in, 18
Insurance and suppuration of middle ear, 268
Intercarotid body, 76
Internal ear, 278
    surgery of, 279
Intestinal perforation in typhoid, 197
Intracranial resection of fifth nerve, 46
Intraglandular injections of iodized oil, 93
Intratracheal injections, 251
  thyroid tumors, 92
Intubation of larynx, 141
Involuting breast, suspicious tumors of, 109
Iodized oil, intraglandular injections of, 93
Isolation in scarlet fever, 176

JACKSONIAN epilepsy, 56
Jaundice in rheumatism, 176
  in typhoid, 199
  Widal reaction in, 199
Jaw, actinomycosis of, 68
  lower, 65
    fractures of, 65
    sarcoma of, 67
      treatment of, by x-rays, 67
Jaws, 62
  cystadenomata of, 62
Jugular vein, internal, primary ligation of, 86

KILLIAN'S operation for sinusitis, 249
Koplik's spots, 154

LABYRINTH, 278
Laryngeal crepitus in tuberculosis, 255
  diphtheria, 141
  tuberculosis, 253
    x-rays in, 254
Laryngology, 239
Larynx, intubation of, 141
Leptomeningitis of aural origin, 282
Leukocytes in malaria, 152
Ligation, primary, of internal jugular vein, 86
  of thyroid arteries, 97
Lingual goitre, 90
  tonsils, nervous symptoms due to, 256
Lumbar puncture, 29, 151
    for hydrocephalus, 53
Lumbar puncture in ear disease, 283
Lung, surgery of, 128
Lungs, 127
  fistula of, 127
Lymphatic glands, tuberculous toxæmia with, 81
    x-rays for, 81
  invasion in malignant disease of tongue, 68
  nodes, cervical, 80
Lysol, 152

MALADIE cystique, 107
Malaria, 152
    leukocytes in, 152
Male breast, scirrhous cancer of, 102
    hypertrophied, 102
Mammary cancer, 111
    operation for, 111
  gland, 102
    cystadenoma of, 109
    fibroadenoma of, 107
    tuberculosis of, 105
Marasmus, 223
  and overcrowding, 224
  and thymus gland, 224
  and tuberculosis, 225
Massage of heart, 120
Mastitis, chronic, 107
Mastoid, 276
Mastoiditis, 276
  condensing, 277
  heat or cold in, 276
  neuralgic, 277
Measles, 154
  blood changes in, 155
  conjunctivitis in, 156
  diazo reaction in, 154
  Koplik's spots in, 154
  otitis media in, 156
  temperature in, 155
Meningitis, epidemic, 149
    herpes in, 150
    lumbar puncture in, 151
    lysol in, 152
    treatment of, 151
Meningotyphoid, 201
Mental disturbances in middle-ear suppuration, 270
Menzer's serum in rheumatism, 174
Mesenteric gland, rupture of, in typhoid, 198
Metastasis in benign tumors, 99
  in lesions of thyroid gland, 100
Meteorological conditions and pneumonia, 159
Micro-organisms of rheumatism, 172
Middle ear, 261
    osseous necrosis of, 267
    suppuration of, 262
      and mental disturbances, 270
      gastrointestinal disturbances and, 262
      home treatment of, 272
      insurance and, 268
      rhodan in, 271
      sulphur vapors for, 267

Military service and perforation of tympanic membrane, 285
Milk, bacteria in, 228
    coagulated, 231
    condensed, 228
    cows', 228, 234
    ferments in, 237
    temperature of, 236
Morphine in cerebral injuries, 25
Moser's serum in scarlet fever, 180
Mosquito and yellow fever, 207
Mumps, 157
    endocarditis, 157
Myringotomy to improve hearing, 273

NÆVI, treatment of, by x-ray, 70
Nasal discharges in scarlet fever, 177
    passages, atresia of, 73
    sinuses, accessory, 242
    suppuration, 242
Nasopharyngeal fibromata, 72
Neck, 76
    surgery of, 17
Nephritis of scarlet fever, 180
    tonsillitis a cause of, 253
Nerve, acoustic, neurofibroma of, 34
    auditory, division of, for tinnitus aurium, 48
    facial, 49
        anatomy of, 51
Nerves, cranial, 39
        in fracture of skull, 21
Neural anastomosis for facial palsy, 49
Neuralgia, trifacial, and sinuses of nose, 48
        classification of, by cocaine injections, 47
    trigeminal, 39
        osmic acid for, 43
Neuralgic mastoiditis, 277
Neuritis, optic, in paratyphoid, 206
Neurofibroma of acoustic vein, 34
Newborn, acute pemphigus of, 214
    hemorrhagic diseases of, 209
    infants, septic infections of, 211
Nose, lesions of accessory sinuses of, 48
    saddle, 75

OCCIPITAL route for incision of Gasserian ganglion, 46
Œsophagus, foreign bodies in, 89
Ophthalmia neonatorum, 212
Optic chiasm, tumors of, 32
    neuritis in paratyphoid, 206
Osmic acid for tic douloureux, 43
Osseous necrosis of middle ear, 267
Osteoplasty in brain operation, 61
Otitic brain abscesses, 285
Otitis media, acute, 264
            general treatment of, 272
            in measles, 156
            in pneumonia, 169
            prophylaxis of, 264
        paracentesis in, 268
        suppurativa, 266
            gauze drain in, 266
Otology, 259
Ozæna, serum therapy of, 256

PALSY, facial, neural anastomosis for, 49
Paracentesis in otitis media, 268
        of pericardium, 113
Paraffin prothesis for facial atrophy, 69
Paratyphoid, 137
    optic neuritis in, 206
    symptomatology of, 205
Parotid glands, mixed tumors of, 78
Parotitis, secondary fatal, 80. *See* Mumps.
Pemphigus, acute, of newborn, 214
Perforation, intestinal, in typhoid, 197
    of tympanic membrane, 285
Pericardium, 113
    drainage of, 113
    hæmo-, 114
    paracentesis, 113
Pertussis, 207
    serum treatment of, 207
Pharyngeal tonsils, tuberculosis of, 255
Pharyngotomy for removal of foreign bodies, 89
Pharynx, foreign bodies in, 89
Pia mater, angioma of, 34
Pleura, 126
Pneumatic chamber, Sauerbach's, 130
Pneumococci, prevalence of, 160
Pneumococcus, agglutination of, 136
    endocarditis, 167
Pneumonia, 134, 150, 157
    antipneumonic serum in, 172
    autopsy reports on, 163
    contagiousness of, 158
    endocarditis, 167
    epidemic of, 158
    herpes in, 165
    meteorological conditions and, 159
    otitis media in, 169
    statistics on, 161
    treatment of, 170
    venesection in, 171
Polypoid growths at base of skull, 88
Premature infants, 216
Prevention of brain adhesions, 59
Prognosis in typhoid, 201
Prophylaxis in acute otitis media, 264
Psychical disturbances in lesions of frontal lobe, 26
Pulmonary fistula, treatment of, 127
    infusions, 187
Pulsating exophthalmos, 83
Pulse in diphtheria, 143
Pyopericarditis, surgical aspects of, 114

RACHITIS, 216
        and craniotabes, 221
        diastasis of recti muscles in, 212
        etiology of, 216
        indications of, 219
        radiographs in, 221
Radiographs in rickets, 221

Recti muscles, diastasis of, in rickets, 221
Resection of cervical sympathetic for Graves' disease, 98
  of fifth nerve, 47
  of submaxillary division of fifth nerve, 46
Retromastoid route for excision of Gasserian ganglion, 46
Rheumatism, 172
  etiology of, 172
  jaundice in, 176
  Menzer's serum in, 174
  micro-organism of, 172
  salicylates in, 175
  treatment of, 174
Rhinology, 239
Rhinoplasty, 73
Rhodan in saliva, 271
Rickets. *See* Rachitis.
Rodent ulcer, 71

SADDLE nose, 75
Salicylates, ear changes from, 287
    in rheumatism, 175
Saliva, rhodan in, 271
Sarcoma of brain, 32
  of chest wall, 125
  of dura mater, 33
  of tongue, 68
Sauerbach's pneumatic chamber, 130
Scarlet fever, 155, 176
    arrhythmia in, 179
    aural discharges in, 177
    cardiac changes in, 178
    complicated cases of, 177
    fever in, 177
    ice-bag for heart in, 180
    infectiousness of, 177
    isolation of, 176
    Moser's serum for, 180
    nasal discharges in, 177
    nephritis of, 180
    tachycardia in, 178
    treatment of, 180
    urotropin in, 180
Scirrhous carcinoma of male breast, 102
Scurvy, infantile, 222
    hæmaturia, 222
    treatment of, 223
Septic infections of newborn, 211
Serum, antidysenteric, 148
  antipneumonic, 172
  diagnosis of infectious, 135
  Menzer's, 174
  Moser's, 180
  treatment of Graves' disease, 98
    hay fever, 239
    ozæna, 256
    typhoid, 204
    whooping-cough, 207
Sigmoid sinus, thrombosis of, 38
Sinus, cavernous thrombosis, 38
  disease, 244
  pericranii, 38
  thrombosis of sigmoid, 38
Sinuses, accessory, nasal, 242
  cranial, 38
  frontal, exostosis of, 72
  of nose, lesions of accessory, 48
Sinusitis, frontal, Killian's operation for, 249
Skull, fracture of, 18
    basal, 23
    cerebrospinal fluid in, 20
    concussion in, 22
    cranial nerves in, 21
    hemorrhage in, 20
    temperature in, 22
    treatment of, 22
  polypoid growths and base of, 88
  topography of, 61
Smallpox, 181
  effects of vaccination for, 181
Starch in infant feeding, 232
Statistics on pneumonia, 161
Status lymphaticus, 88
Stegomyia fasciata, 133
Stenosis of the external auditory canal, 259
Sternomastoid hæmatoma, 215
Struma occulta, 96
Subhyoid bursæ, 87
Sulphur vapors for suppuration of middle ear, 267
Supernumerary breasts, 103
Suppuration, antral, 248
  in otitis media, 266
    gauze drain in, 266
  nasal, 242
  of middle ear, 268
      and insurance, 268
      and mental disturbances, 270
      home treatment of, 272
      rhodan in, 271
Surgery of brain tumors, 29
  of head, 17
  of internal ear, 279
  of lung, 128
  of neck, 17
  of thorax, 17
Surgical treatment of goitres, 93
Suture of heart, 116
Sympathetic, cervical, excision of, for epilepsy, 58
    resection of, for Graves' disease 98
Symptomatology of paratyphoid, 205
  of typhoid, 192
Syphilis, pseudomembranous angina of, 140

TACHYCARDIA in scarlet fever, 178
Temperature in measles, 155
Tetanus, 182
  prophylaxis in, 182
Thoracotomy in Sauerbach's pneumatic chamber, 130
Thorax, 102
  surgery of, 17
Thrombosis, cavernous sinus, 38
  of sigmoid sinus, 38

Thrombosis, venous, in typhoid, 196
Thymus gland and marasmus, 224
Thyroid arteries, ligation of, 97
    cancer of, 93
        invasion of trachea by, 92
    gland, 90
        metastasis following lesions of, 100
    grafting, 101
    tumors, intratracheal, 92
Tic douloureux, 39
        etiological factors in, 48
        osmic acid for, 43
Tinnitus aurium, division of auditory nerve for, 48
Tobacco and hearing, 282
Tongue, 68
    lymphatic invasion in malignant disease of, 68
    sarcoma of, 68
Tonsil, tuberculosis of pharyngeal, 255
Tonsillitis, a cause of nephritis, 253
    blood poisoning from, 252
Tonsils, lingual, nervous symptoms caused by hypertrophy of, 256
Topography of skull, 61
Torticollis, 76
Toxæmia associated with tuberculous glands, 81
Trachea, bursting of tuberculous abscesses into, 89
    invasion of, by cancer of thyroid, 93
Tracheotomy, fatal hemorrhage after, 89
Traumatic chylothorax, 129
Traumatism to head, 17
Treatment of atresia of nasal passages, 73
    of brain tumors, 29
    of chronic affections of middle ear, 267
    of diphtheria, 139, 145
    of dysentery, 147
    of empyema, 126
    of epidemic meningitis, 151
    of epilepsy, 53
    of facial atrophy, 69
        palsy, 49
    of fracture of skull, 22
    of goitre, 93
    of Graves' disease, 96
    of hay fever, 239
    of hydrocephalus, 51
    of mammary cancer, 111
    of nævi by *x*-ray, 70
    of nasal suppuration, 246
    of otitis media, 272
            acute, 265
    of ozæna, 256
    of pneumonia, 170
    of pulmonary fistula, 127
    of pyopericarditis, 114
    of rheumatism, 174
    of rodent ulcer, 71
    of saddle nose, 75
    of scarlet fever, 180
    of scurvy, infantile, 223
    of suppuration of middle ear, 272
    of tic douloureux, 39, 43
Treatment of torticollis, 76
    of tuberculosis, 182, 187
    of whooping-cough, 207
Trephining under local anæsthesia, 60
Trifacial neuralgia, 39
        classification of, by cocaine injections, 47
        osmic acid for, 43
        sinuses of nose and, 48
Trigeminal neuralgia, 39
        osmic acid for, 43
Tuberculosis, 137, 182
    administrative control of, 183
    and marasmus, 225
    heart lesions in, 185
    house infection in, 185
    laryngeal, 253
        x-ray for, 254
    nodes of infection in, 184
    of brain, 287
    of breast, primary, 105
    of mammary gland, 105
    of pharyngeal tonsil, 255
    pulmonary, laryngeal crepitus in, 255
    treatment of, 182, 187
Tuberculous abscesses, bursting of, into the trachea, 89
    glands, 81
        toxæmia in, 81
        x-ray for, 81
Tumors, benign, metastasis in, 99
    cerebellar, 34
    cranial, 29
        lumbar puncture for, 29
        surgical aspects of, 29
        treatment of, 29
    intratracheal, thyroid, 92
    of carotid body, 76
    of lateral ventricle, 32
    of optic chiasm, 32
    of parotid glands, 78
    suspicious, of the involuting breast, 109
Turbinate, inferior, chancre of, 258
Tympanic membrane, in military service, 285
            perforation of, 285
Typhoid fever, 135, 188
        and arteriosclerosis, 137
        blood cultures in, 191
        diet in, 204
        gallstones and, 199
        important symptoms in, 192
        intestinal perforation in, 197
        jaundice in, 199
        meningo-, 201
        prognosis in, 201
        rupture of mesenteric gland in, 198
        serum treatment of, 204
        venous thrombosis in, 196
        Widal reaction in, 135, 190

ULCER, rodent, 71
Umbilical-cord hernia, 213
Umbilicus, fungosity of, 214
Urotropin in scarlet fever, 180

VACCINATION, effect of, on health, 181
    Varicella, 155
Variola. *See* Smallpox.
Vein, internal jugular, primary ligation of, 86
Venesection in pneumonia, 171
Venous thrombosis in typhoid, 196
Ventricle, lateral tumor of, 32

WHEY, albumin content of, 236
    Widal reaction, 135, 190
        Ficker's modification of, 190
        in jaundice, 199
Whooping-cough, 207
    serum treatment of, 207
Wounds of chest penetrating diaphragm, 123
    of heart, 116, 119

X-RAY for Graves' disease, 98
    for Hodgkin's disease, 82
    for laryngeal tuberculosis, 254
    for sarcoma of jaw, 67
    for tuberculous glands, 81
    treatment of nævi, 70
        of rodent ulcer, 71

YELLOW FEVER, 206
    mosquito and, 207

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EDITED BY

HOBART AMORY HARE, M.D.
Professor of Therapeutics and Materia Medica in the Jefferson Medical College, Philadelphia

ASSISTED BY

H. R. M. LANDIS, M.D.
Assistant Physician to the Out-Patient Medical Department of the Jefferson Medical College Hospital

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